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CONTRACTING • AIR CONDITIONING



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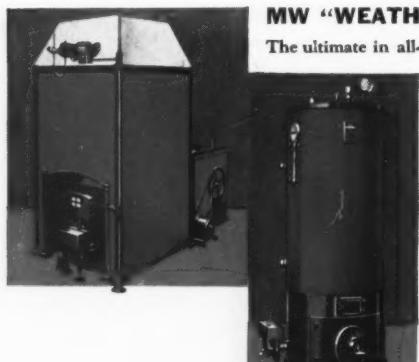
ested in the commercial type of MW Automatic Oil-Burning Water Heater supplying hot water at costs far below gas or any other method.

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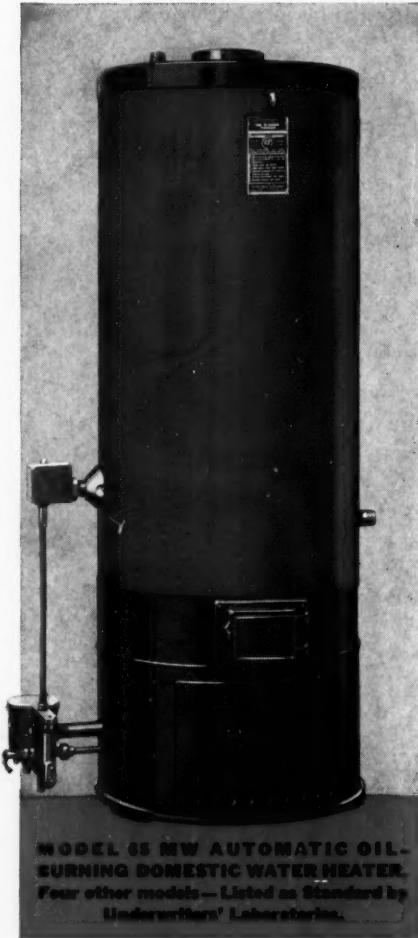
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The ultimate in all-year comfort—winter warmth with healthful humidified air—summer relief with cooling air in all rooms. Uses present air ducts in walls, reduces basement ducts.—Listed as Standard by Underwriters' Laboratories.



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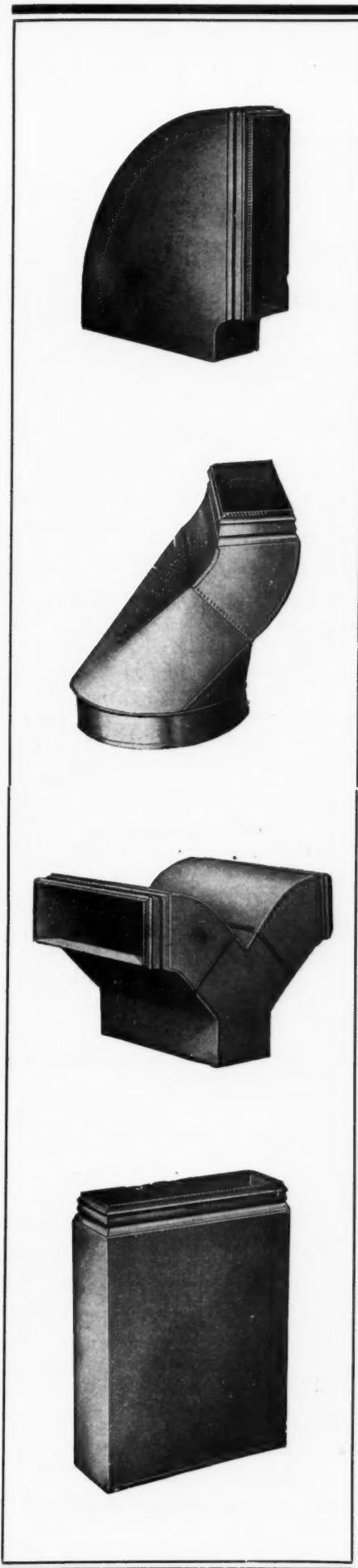
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ing in winter, cooling in summer), Automatic Oil-Burning Boiler Units for Steam or Hot-Water Heat, Automatic Oil-Burning Water Heaters, and Oil-Burning Cooking Ranges, the line has no slack season, but assures dealers of steady, all-year round business.

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FOR ALL DOMESTIC AND COMMERCIAL NEEDS

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and Your Tongue**

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PEORIA, ILLINOIS

Covering All Activities
IN
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Merchandising
Ventilating

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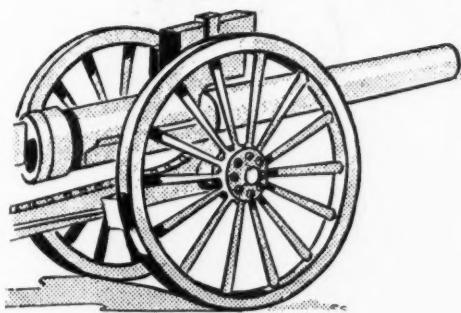
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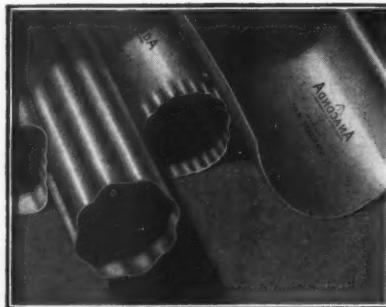
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“After spending more money for repairs than they ‘saved’ by using rustable metal, they are sold on Copper sheet metal work.”



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AMERICAN ARTISAN

VOLUME 101

NUMBER 9

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

Our Bread and Butter "Backlog"

MOST of us are familiar with the term "backlog," a word which has been popularized by the steel and iron industries who apply the term to work in hand, but requiring no particular production rush.

The warm air heating industry also has its backlog.

This backlog is gravity furnace heating. It is our backlog because during the time we are making forced air and semi-air conditioning household necessities, the gravity plant must remain the bread and butter of our manufacturers and dealers.

Industrial history shows that industries which forget their backlog in the enthusiasm over new ideas and new products are more apt to lose their shirts than industries which continue to rely on the backlog for profit and sales while these new ideas are taking hold.

This rule which manufacturers have found valuable, applies just as forcefully to the installer or dealer. Like the manufacturer, he is apt to get so enthused over air conditioning that he wants to get away from work which has lost its novelty through long familiarity.

In furnace heating nothing is so dog-eared as the gravity furnace job. Most contractors have installed so many of these bread and butter plants that gravity jobs fail to arouse any enthusiasm. At the same time, these men who have lost interest in gravity work are fertile prospects for forced air enthusiasm of the sort which leads the contractor to devote his time and efforts to soliciting forced air jobs.

This enthusiasm for promoting forced air should not be condemned, for if we do not have this enthusiasm, forced air and air conditioning can never become the necessity we fully anticipate. Nevertheless, the contractor must realize that while air conditioning offers more interest and should offer greater profits, this field has not yet reached the stage where it can keep all the thousands and thousands of shops in the country in full time work.

Even the contractor who is determined to follow air conditioning all the way through, will eventually understand that every householder cannot buy air conditioning and that below certain levels of income the gravity plant will likely remain the standard heating system of America.

We are fully aware of the feeling that gravity work has reached such a cut-throat level that good business men fight shy of it, yet the fact remains that there must always be owners who want the best gravity system they can buy, installed by a reliable contractor who knows his business and guarantees his work.

Such home owners are by no means as few and far between as some men in this industry would have us believe. The very fact that there comes to the editor's desk many, many letters every month telling about gravity installations of the highest class is proof that good gravity can still be sold.

We have said that there can be profits in gravity work. We say this because we are firmly convinced that there must be thousands of owners and potential home owners who appreciate that a first-class gravity installation requires sound judgment in design and some freedom in cost in order that every requirement of comfort, convenience and economy shall be met.

This class of prospect should increase as air conditioning grows more popular. Every bit of publicity which stresses the features of air conditioning should help dealers to sell better and more costly gravity installations.

There is no good reason why the owner of a gravity plant should not be as much interested in automatic operation as the owner of a forced air installation. Both like to lie in bed in the morning and have the house at a constant temperature all day long.

Neither is there any reason why the gravity plant owner does not want proper humidity which can be supplied just as readily by gravity flow as in the more costly semi-air conditioning system.

And of most importance, there is no sound reason why these owners who understand why such improvements make for greater comfort, convenience and health, but who do not feel able to buy air conditioning, cannot be made to see that gravity offers these features if only they will spend a little more money.

Is there any good reason why we can't all picture gravity work as an interesting, profitable field of operation and forget all the water which has gone under the dam?



Copper Details of the New Ohio State Office Building

IN Columbus, Ohio, there is just being completed a new office building to house various state departments. This imposing structure, known as the Ohio State Office Building, has been in the public eye due to an explosion which destroyed a considerable portion of one of the lower elevations.

The building is topped with a copper roof, highly ornamented, which in point of amount of copper used and interesting details of fabrication and erection is easily one of the outstanding metal contracts of recent months.

The copper application is being handled by The Forshee Company, of Columbus, Ohio, sheet metal and roofing contractors. Several months have been required to fabricate and apply the more than 50,000 pounds of copper used on the building.

From a standpoint of poundage, the batten type roof is the most important part of the Forshee contract. The photograph of the build-

ing exterior shows that this roof is rectangular in outline and designed with two long sides, two short ends and a flat deck at the top.

The Roof

The wood battens of the roof are placed on 20-inch centers and run from gutter to deck molding excepting where the roof is broken by the dormers. The construction of the roof is of standard design with pan sheets between battens, separate batten covers with special shoes for the lower ends of the battens and with the pan sheets clipped to the battens, as shown in one of the details.

The pan sheets were placed in lengths of approximately 18 feet. All pan sheets were formed on the job in a special shop equipped by the contractor. These pan sheets were applied so that the seams are staggered in alternate bays with one full length laid at the bottom of

one bay, followed by another full length sheet and topped out with a short length. In the next bay the short sheet was placed at the bottom followed by the two full length sheets. This construction shows plainly in one of the photographs of the roof.

The batten covers were all formed in the Forshee shop and delivered to the building ready for locking over the pan sheets. These covers are in longer lengths than the pan sheets and are applied uniformly over the roof.

The ends of the battens are closed with a special copper shoe locked into the covers and pan sheets, and then soldered. The top of the battens are soldered to the deck molding which, as shown in the photograph of the roof, is plain and square faced with soldered joints.

The battens of the roof are two inches high, two inches wide at the top and $1\frac{3}{4}$ inches wide at the bottom allowing one-quarter of an

inch for pan sheet expansion.

The four hips of the roof have the same square-faced outline as the deck mold and battens are soldered to the hips with pan sheets and batten covers cut to the pitch of the hips.

The Dormers

The long sides of the roof are about 250 feet from end to end. Along these two sides window dormers are let through the roof to provide light for the attic. In design, these dormers are somewhat unusual in that the general appearance is heavy enough to make the dormer a pronounced feature of the roof as seen from the ground. The construction of the dormer is concrete with wood nailing strips placed in the concrete sides for fastening the copper siding sheets.

The top of the dormer is sheathed in two pieces of copper brought to a flat locked seam along the center line and locked at the edge of the raised step which forms the center of the roof. From this lock a second and lower step is similarly covered with a copper sheet, which in turn is locked at the edge to the third and still lower step which is quite narrow. This third step of the roof is covered with a turned back and up edge of the top siding sheet.

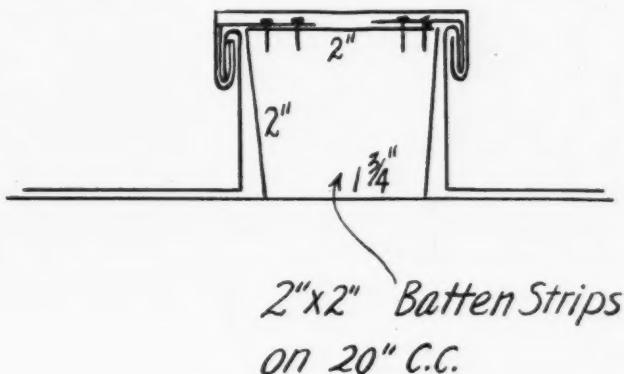
There are four siding sheets used on each face of the dormer. These siding sheets are stepped, quite like wide wood siding, and secured at the bottom edge with slip locks. The sheets are clipped along the nailing strip. Just how this construction was accomplished is shown in the dormer detail and also in the roof photograph.

These siding sheets are turned

The batten construction follows customary practice, with provision for expansion and clipped pan sheets. Covers were especially made

tricate details of the project is the ornate copper cornice which surrounds the base of the roof. In the cornice the straight run sections shown by arrows on one of the photographs were furnished as standard stampings, while the shields and the corner pieces were fabricated in the Forshee shop.

The cornice is quite ornate with deep stampings used in the vertical



around the front face where the copper siding is joined to the curved and straight copper work which closes the window frames.

The Cornice

The dormer roof sheets and the siding are all soldered to the main roof sheets. Roof sheets were brought over the dormer roof to provide a lap for soldering.

One of the interesting and in-

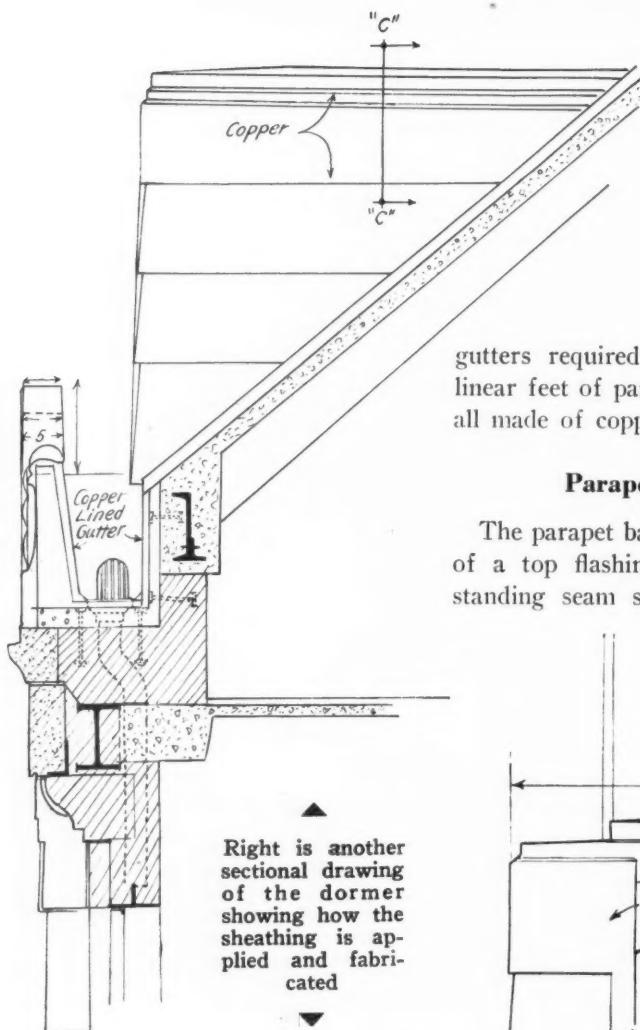
leaves which stand side by side between the shields and the heavy block pattern which lies next to the masonry.

The same deep ornamentation also applies to the shields and the corner blocks; however, these sections were fabricated and not stamped.

There are approximately 600 feet of cornice around the roof. In all there are 32 shields. The cornice



The batten type roof and copper sheathed dormers behind an ornamental cornice constitute the interesting and dominating feature of this modern building. Many shop and field fabrication details were involved



gutters required more than 2,000 linear feet of parapet wall flashing, all made of copper.

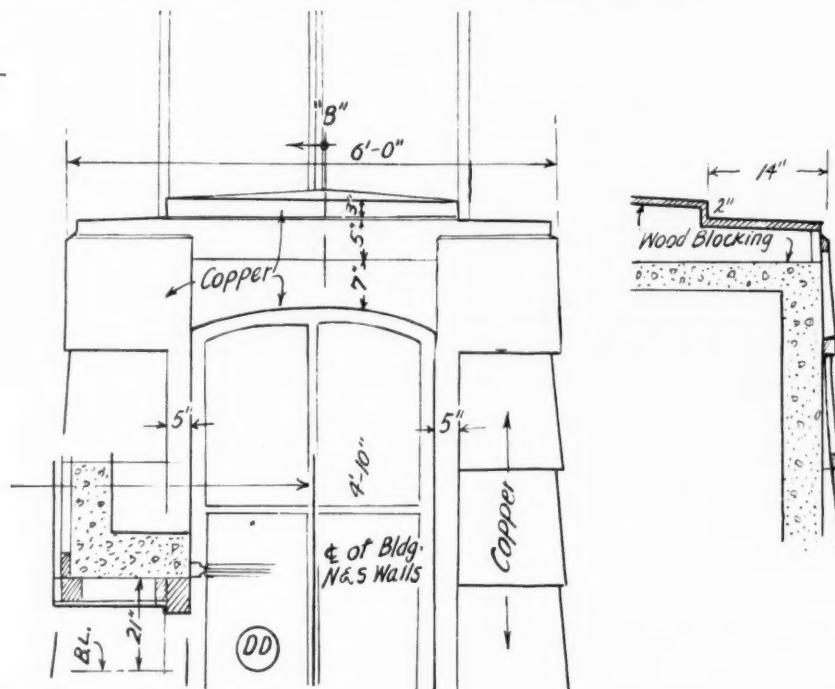
Parapet Walls

The parapet backing is composed of a top flashing sheet, a center standing seam section and at the

bottom a lower flashing which is carried over the tile of the deck. One of the details shows just how this sheet metal backing is applied.

Note on the detail and in the photograph how the top flashing sheet is run back under the top marble coping. The detail does not show that the backup for the face of the parapet is brick. In the brick vertical nailing strips were placed at points behind the standing seams of the copper. The backing sheets were formed for standing seam locks and clipped to these nailing strips.

The center section is locked top and bottom with the flashing sheets as shown in the detail.

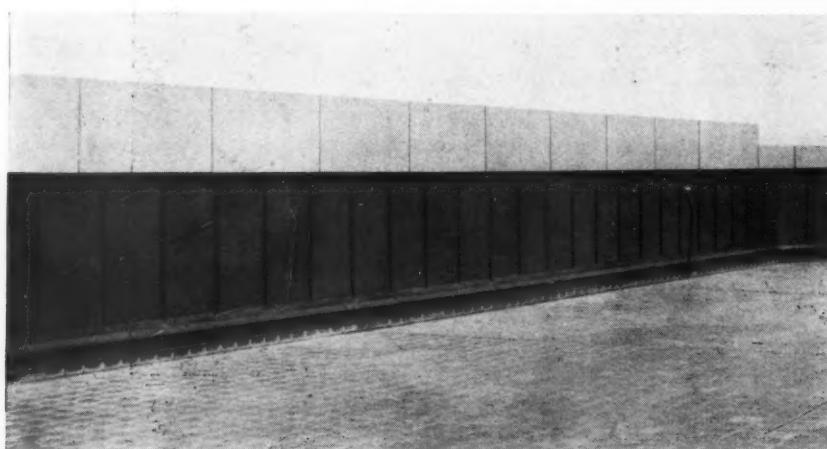


and gutter are formed in 20-ounce copper as compared with 16-ounce used for the roof.

The details of the cornice are shown clearly in the photographs.

The top two floors and the attic of the building are set behind flat gutters and decks and a three-foot parapet wall. These decks are quite large at the ends of the building and with the outside face of the

Below is a photograph of one of the parapet wall backings around a deck. Construction is shown in another detail



A part of the Forshee contract entailed the application of four-ply construction waterproofing under the walking tile of the decks. On top of this waterproofing the tile were cemented down and brought up in a vertical row against the parapet wall. It is over these tile that the flashing is carried.

The Gutters

The flat deck at the top of the roof was covered with four-ply built up asphalt roof with a gravel surface applied by the Forshee company.

The four sides of the roof end at the bottom in a deep copper-lined



The cornice is a highly ornamental affair with deeply stamped and fabricated sections. The cornice is about the only ornamental feature of the building

gutter. The back face of this gutter and the front face are both sheathed in standing seam copper similar to the backing around the thirteenth floor decks. Drains from this gutter are all carried down the inside of the curtain walls with the gutter bottom sloped at intervals for drainage.

One of the photographs of the roof show wide straps running from the bottom of the batten roof across

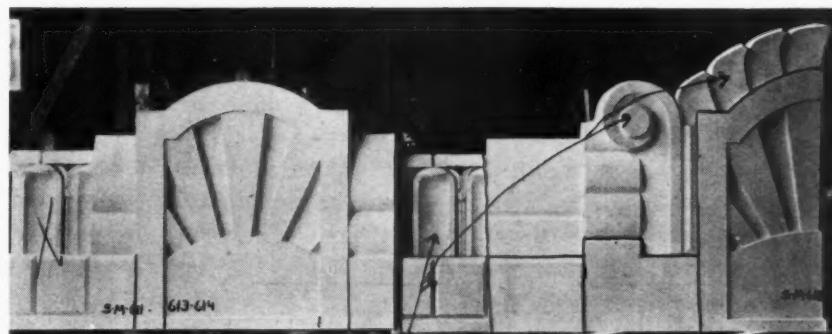
to the top of the cornice. These straps are $1\frac{1}{4}$ by $\frac{5}{8}$ -inch brass straps anchored in the concrete roof deck and into the cornice. The straps are placed on approximate 8-foot centers. The purpose of these straps is to reinforce the cornice against heavy snow or ice pressure and impact from sliding snow and ice.

There will also be installed in the gutter a steam snow melting line to be turned on in times of heavy snow.

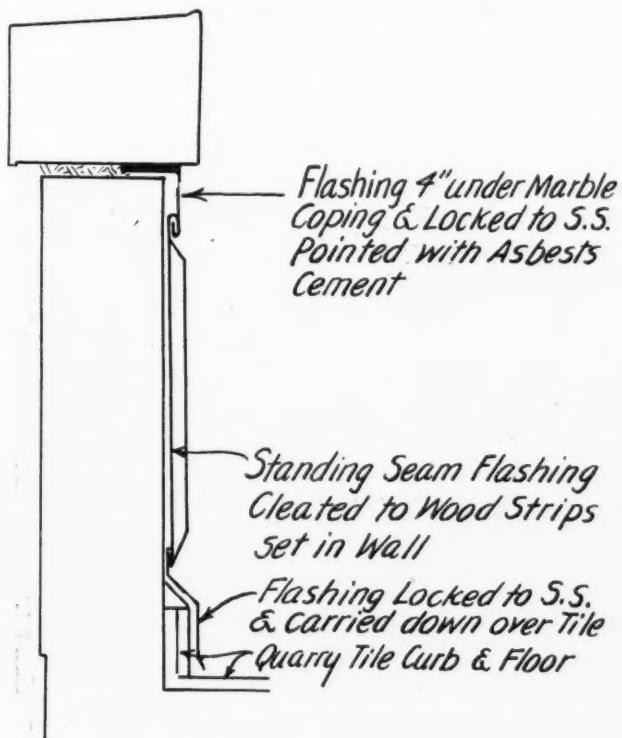
Ventilation Sinks

The gutter is also provided with specially designed expansion joints all along the bottom and sides.

One of the interesting features of the contract, which does not show



The sections indicated by arrows are standard stampings. All other sections such as shields, corner sections and intermediate panels were fabricated in the Forshee shop

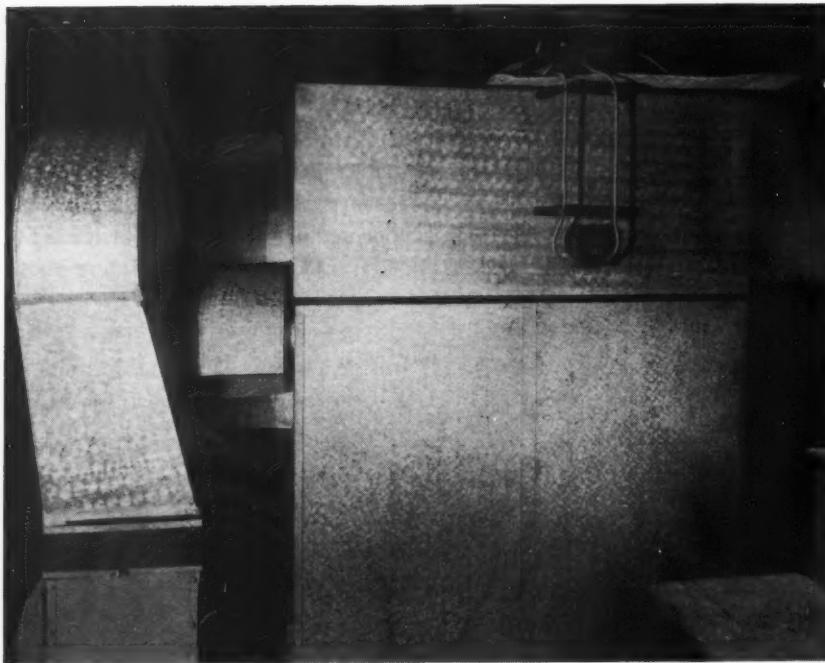


Left is a cross section drawing showing the construction of the parapet wall copper backing. These sections are stiffened by standing seam construction and seamed top and bottom to the flashing. Note how the lower flashing is brought over the walking tile of the deck. Similar construction is followed along the gutters

in the photographs, is the method of exhausting air and bringing in outside fresh air through two large sinks in the top roof deck. These sinks are about 20 feet square and about 8 feet deep. The sides of these sinks are sheathed in copper fabricated standing seam similar to the parapet backing.

At the floor level where the round columns show on the exterior photograph, there are window depressions which are lined with 3-pound sheet lead pans installed by the Forshee company. There are 64 of these pans requiring some 2,000 square feet of lead sheeting.

The Ohio State Office Building was designed by Harry Hake, architect, with Frank W. Bail and Alfred A. Hahn as associated architects.



The blower is placed up against the ceiling so that the return duct comes straight in from the ceiling level. Discharge is downward into the base of the furnace.

WARM air heating contractors and sheet metal workers who are hesitant in tackling large jobs in competition with steam may be interested in the results of a pitched battle between the two systems—with gas as the fuel for both—that was completed recently in Alabama. The two plans were compared, one against the other, by the purchaser and the order went to the alert warm-air men. Furthermore, the purchaser is entirely satisfied with the performance of the new heating plant.

The competition started when the board of the First Presbyterian Church, Talladega, Alabama, decided that a new heating system had to be installed in the church. The old one was failing to do the job, and the board determined as a result of this experience to test the various plans presented in every way, so that the one selected would be absolutely the ideal method for the church.

The church is a long, narrow building, of brick construction, approximately 140 feet long and 60 feet wide at the widest section. Churches of similar design are to be found in thousands of towns throughout the country.

F. W. Holbrook, manager of the Talladega office of the Alabama Natural Gas Company, interested the church authorities in using natural gas as the heating medium and

showed them the advantages of having the heating system automatically controlled. S. L. Smith, gas company engineer, surveyed the church and presented his recommendations. The problem then arose as to which heating system would be the most satisfactory: steam or warm air.

Complete plans for a mechanical warm air system were prepared for the church board. A similar proposal for steam was submitted at the same time, and the two were compared point by point. The church board decided upon warm air as the least expensive to operate and most satisfactory for their problem.

The building presented quite a



This exterior picture shows the one-story, high ceiling type of building with large wall areas and comparatively small windows.

Warm In

Air Defeats Steam Big Alabama Church Job

By S. H. CADY, JR.

problem, for the church auditorium is 24 feet high, the difference in temperature in the old heating system, between the floor and the ceiling, running as much as 75 degrees. A cold floor—and at the same time a tremendous heat loss through the roof—was common. Furthermore, the only basement was under the front end of the church, so the furnace had to be located there and the warm air forced as far as 150 feet in order to reach the Sunday School room at the rear.

In designing this installation, the engineers had a three-fold job to undertake:

1. To eliminate air stratification.
2. To heat the distant Sunday School room without overloading the furnace, wasting fuel, and overheating the front part of the church.
3. To provide an automatic system, using gas.

The heat loss was estimated at 360,000 B.t.u. from 15 degrees to 70, with an extra 75,000 B.t.u. for starting load.

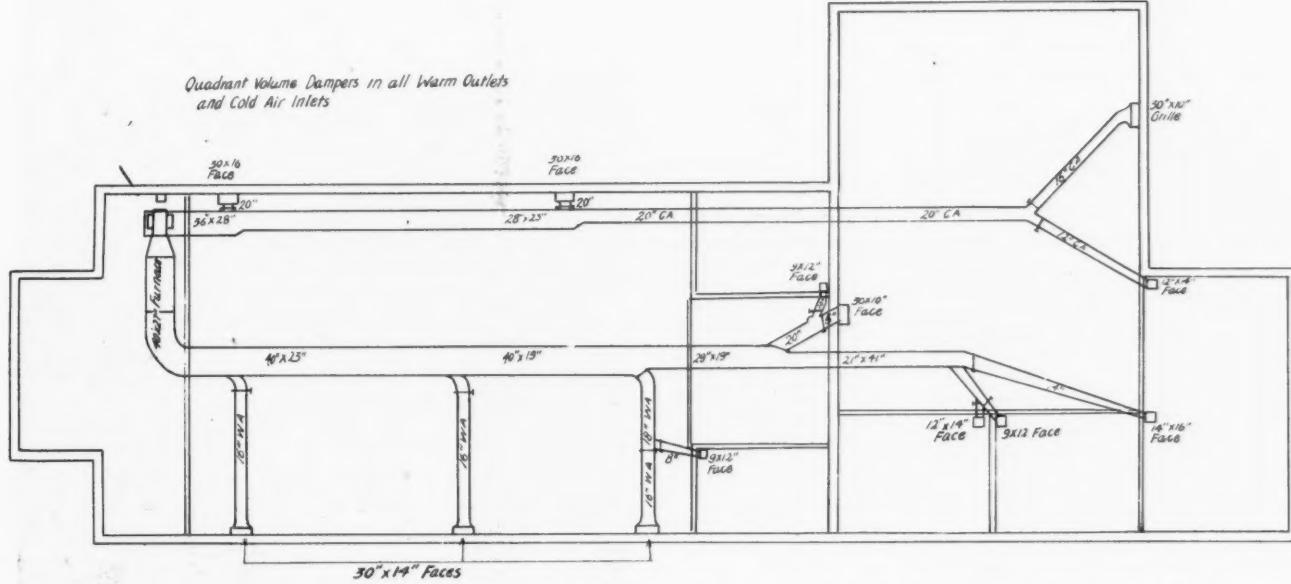
The job, of course, required a blower to force the warm air over the long distance to be covered and to insure a smooth, even temperature.

Two Pennsylvania Furnace and Iron Co. Industrial Units, in one casing, were used, with an input of 560,000 B.t.u., and developing 435,000 B.t.u. at the bonnet. As the units were cased close for blower work only, it was assumed that under actual test on the job with a blower, the efficiency would increase to 85 per cent rather than the 75 per cent calculated. This extra 10 per cent, however, was not taken into account when the installation was designed, and any efficiency in excess of 75 per cent obtained would go to increase the

starting load or safety factor.

In selecting the blower, it was decided that to eliminate air stratification as much as possible, six changes would be needed for the 24-foot ceiling. The blower selected was an 8,000-c.f.m., Type B Furblo. The duct work was designed for an air velocity of 1,000 c.f.m., the outlets being increased to permit a delivery of 500 feet. Volume dampers were used in all warm air outlets and return air ducts.

The plan of the duct system shows that a somewhat unusual design was followed—introducing warm air alongside one wall of the auditorium and taking return air from grilles along the opposite wall. The system contemplates throwing a blanket of warmed air up to the dead strata of warm ceiling air where the incoming air will distribute itself across the width of the room and be pulled out after cool-



Heat is introduced along one wall through inlets placed in the floor. Cooled air is drawn down from the ceiling along the opposite wall and returned directly to the blower. This design resulted in a simple and economical duct system.

ing through the side wall grilles.

The plan also shows that the warm side of the system is considerably longer than the return, but this is balanced through duct sizings. Small rooms across the front of the building are served by branches from both supply and exhaust lines.

The job was completed and placed in operation. Several things very soon became apparent:

1. Warm air heat was entirely practical for this type of building.

2. Air travelling at 1,000-foot velocity is not noisy if the installation is properly made, and neither is the operation of the blower noticeable, but a quiet, efficient dis-

tribution of heat results.

3. A cold floor—while plenty of heat escapes near the ceiling—can be remedied with an installation using a blower. The system in this church reduced the differential between the floor and ceiling to 15 degrees.

4. The loss of temperature between the furnace and the furthest outlet (150 feet in this case) need not be great. It should be remembered that in this job the warm air ducts were not even insulated, and yet the loss was very small.

The church board is entirely satisfied with its new heating plant. Also, this first installation of the kind in the locality brought mem-

bers of the Presbyterian Church and many outsiders to inspect the church's new heating plant—the best kind of advertising. According to the contractor, this one installation is sure to do more for warm air heating in the vicinity of Talladega than any other move could have accomplished.

The church members anticipate that with a few changes, this system can be used in the summer for circulating the air—an especially important factor in the South where very hot weather is to be expected. Furthermore, as soon as gas refrigeration is more practical, the church will at once consider the addition of this equipment.



World's Largest Coffee Pot—A Sign

EVER since the little uneasiness known as The Boston Tea Party, Boston harbor is said to be the biggest tea pot in the world. Los Angeles, however, claims to have the largest coffee pot in the world—and incidentally it has four of these coffee pots, all alike and all the same size.

The coffee pot shown in the accompanying picture is the conception of a Los Angeles sheet metal worker and was created as a wayside advertisement for one of that city's largest coffee roasting and wholesale firms. It measures 20 feet across the bottom and stands 24 feet high. It is safely moored to the top of the building—a wayside eating house—by angle-iron braces and is artistically colored with green and aluminum paints. It is visible for about three blocks in all directions.

As an additional realistic feature an arrangement has been built in the kitchen of the building for generating steam which by means of a long sheet metal pipe shoots intermittent puffs of steam from the spout of

the kettle. Around the base of the kettle flood lights have been placed to illuminate the exterior at night. By playing upon the spouting puffs of steam these lights give a Vesuvius effect that invariably attracts the attention of the motorist.

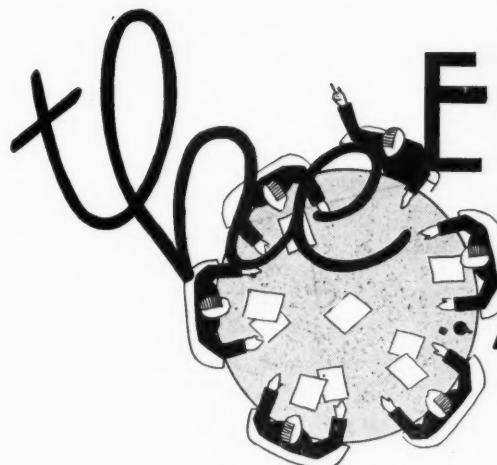
It might be noted that the coffee

company erects the buildings subject to lease, the firm taking them over agreeing to use no other kind of coffee during the life of the lease.

The pot when all assembled for installation weighed exactly three and a half tons.

This coffee pot advertises a wayside eating place. The pot is made of galvanized iron painted. Such signs are proven business builders for Los Angeles contractors.





EDITOR'S Roundtable

Should We Correct Factor 55?

WE published in the March 28 issue a question submitted by B. L. Schwartz, heating contractor of Pittsburgh. Mr. Schwartz asked why should Factor 55 continue to be used.

From J. C. Miles of the Warm Air Furnace Fan Co., Cleveland, comes a letter of much interest in that it relates some pertinent history and keen observations in the heating industry. Mr. Miles says—

"Who started this article—'Should We Abolish the Factor '55'?"

"I regard this argument as a personal affront as most of the furnace men know that this factor '55' was the one outstanding and most dramatized phase of the warm air furnace engineering course, which I introduced to the warm air furnace industry way back in 1923, when furnaces were 'guessed' in and when the ratio of inches of pipe to cubical contents was regarded as scientific engineering.

"The factor '55' indicates the number of degrees one B.t.u. will raise the temperature of one cubic foot of air or the number of cubic feet of air one B.t.u. will raise one degree, and so far as the general run of warm air furnace men is concerned, he most assuredly should not abolish the factor '55.'

"It is true that a number of furnace men have progressed quite materially in the past year, but most of us can easily recall when the mention of a heat unit was looked upon rather askance, and you would immediately be accused of trying to 'high hat' by the mention of B.t.u.

"I can readily understand Mr. Schwartz getting down to the fundamentals of physics as he is a graduate mechanical engineer, and quite naturally would dig deeply into the laws of physics for the more technical points, such as molecular weight of various gases and vapors, absolute temperature, barometric pressure, various

specifics, etc., for proof, and to a college graduate these intricacies are usually a lot of fun, but we must remember that a whole lot of contractors have not had the advantage of a high school education, and a large percentage of the high school graduates are academic rather than technical graduates; all of whom are burdened with the task of accumulating shoes and bread for babies, and with little time to study more than the necessary formulae for calculating the rudiments.

"Tell me to carry a 22-inch firepot down in the basement, and I could probably do it, I would at least try; but tell me to carry a 22-inch steel furnace into the basement, and I would not even attempt it.

"We should always keep in mind the fact that the furnace man has no time to go back to college, and that if we want to help him install better jobs, we must not only meet his mind and training, but we should do it, taking the least possible time from his job.

"In defense of the factor '55' I challenge any man to produce one single concrete phase of the warm air furnace or its appurtenances that will approach the accuracy of the factor '55.'

"A great mathematician was able to prove the electro magnetic phenomena but Faraday discovered it, and Faraday was not a great mathematician, and could not prove it, but he performed one of the great services to science, nevertheless, and while each space between Matthews to Faraday, Faraday to Schwartz, Schwartz to the writer, and the writer to Bill Jones, the furnace man, is a long jump, and each in his own sphere has his work to do, and I can think of no single factor that is of more real constructive value to the writer, and Bill Jones, the furnace man, than the factor '55'."

After reading over the replies published, Mr. Schwartz finds that some of the calculations are seemingly in error. He says—

"I read with interest the responses from G. A. Voorhees and T. H. Geer concerning our question about Factor 55. Both analyses show thought and real consideration of the various phases involved in this discussion.

"Mr. Geer's mathematics are slightly in error when he arrives at a total of $.0141 \times \text{B.t.u.}$ from the equation:

$$\text{B.t.u.} \times 55$$

$(\text{Reg. Temp.} - \text{Room Temp.}) \times 60$
This should be .0131 and is undoubtedly just a typographical error.

"If we correct Mr. Geer's further calculations for this arithmetical error, we arrive at a c.f.m. of 131 @ 10,000 B.t.u. requirement, with a corresponding duct area of 47.5 square inches instead of 51 by his calculations.

"The difference between 53 square inches and 47.5 square inches shows an error of 10.4% instead of 4%.

"Mr. Voorhees' calculations admit an error of:

$$\frac{560 \text{ f.p.m.} - 500 \text{ f.p.m.}}{560 \text{ f.p.m.}} = 10.7\%$$

"Our own calculations (as indicated in our previous article) shows an error of:

$$\frac{60.8 - 55}{60.8} = 9.5\% \text{ by using the factor 55.}$$

"Let us average these results and assume an error of 10%; with all other factors equal. There is nothing complicated in providing the correction for this error. Simply add 10% to the duct sizes calculated by the present rules which were derived by use of the factor 55. If you are using any of the many charts available which were made up on this erroneous assumption (55), increase your readings by 10%; or else make a new chart with values 10% greater all along the line.

"I feel that there is no good reason to start off with a knowing error of 10%, when it is so easy to correct it. My thought in raising the question about the factor 55 was not to abolish it, but to correct it."

A Cleaning Campaign —for Profit!

If you followed the first article of this campaign, you should now be busy bringing your mailing list up to date. You should also have established a price for your cleaning service and you have definitely set down just what you are going to give for this price.

Your next question, naturally, is —WHAT SHALL I DO WITH THIS MAILING LIST?

If you intend to go after cleaning as intensively as possible, you will do two things with this mailing list.

1. You will canvass every name on your prospect list.
2. You will send direct mail to these HOME OWNERS.

Which should you do first?

The First Step

Many contractors have immediately canvassed the names on their lists. The concensus of opinion, however, indicates that some sort of preliminary introductory work should precede the canvassing.

The purpose of this preliminary work is to prepare the home owner for your call. If your canvasser calls on a home owner who has never heard of you or of your service, he has to introduce himself, tell all about the service, explain the price and what you will do for the owner; in short, there will be waste effort.

You can eliminate much of this waste time by first telling the prospect who you are and what you want to do by sending the owner a piece of direct mail or a mail box stuffer.

This is where the direct mail work comes into the picture.

A logical question is—what sort

of first direct mail matter should go out ahead of the canvasser?

Let us answer this by analyzing the problem. The thing you want to accomplish is to let the home

owner know, first, that cleaning his furnace will SAVE HIM MONEY; second, that you are a responsible firm, offering a desirable service; third, let the owner know

CLEAN YOUR FURNACE

THE best time to have your furnace cleaned is right now when you are doing your spring house cleaning.

If you have the work done within the next ten days you can take advantage of our

SPECIAL SPRING CLEANING PRICE

We clean the smoke pipe, the chimney base, paint the front of the furnace, remove all dust from the basement pipes, and clean all cold air boxes and registers. Dust naturally collects in the cold air boxes and back of the registers; where there are children, all manner of things will be thrown there, from marbles to orange peels. Cleaning these boxes makes for a desirable sanitary condition.

What is more important, we remove every bit of soot and carbon from inside the furnace. That restores your furnace to the efficiency it had the day it was installed—which means a saving in fuel.

*Our representative is calling in your neighborhood.
He will call on you tomorrow.*

If you would like him to call at some particuar time phone us. Our number is 340.

SMITH AND JONES

527 Second Avenue
Phone 340

KEEP THIS HANDBILL—IT ENTITLES YOU TO OUR SPECIAL PRICE

Here is suggested copy for a handbill to be placed in the mailbox of a property owner. The size can be varied, but about 7 inches by 9 inches is suggested so that the type can be set in large sizes. Your printer can set this up for you

who you are and what you offer; fourth, approximately when your canvasser will call.

Just how to get this message to the home owner has been worked out in different ways.

Mail Box Stuffers

One way is through the use of mail box stuffers.

What is a stuffer and what should you say on it?

A mail box stuffer is really a handbill. It is one of the cheapest forms of advertising and can also be placed in the hands of your prospect at low cost.

Ordinarily this stuffer is printed on colored paper or low cost white paper. It is put in the mail box by boys you can pick up in your neighborhood or distributed by companies who make a business of such work. Ordinarily a large number of such mailing pieces can be distributed in one day.

The trouble with a general distribution is that the stuffers are placed too far in advance of the canvasser's call.

Synchronize Your Plan

A better method, used by a large number of contractors, is to synchronize the canvassing with the mail box stuffing. This is accomplished as follows:

Let either the boys or the distributing service place only a few stuffers each day. Perhaps you will find as other contractors have that your own canvassers can do the work better and cheaper than special men or boys. For example, give your canvassers twenty stuffers. Assign a number of blocks and let them place these stuffers in the boxes the first thing in the morning. This should not take more than an hour of their time.

After these stuffers are distributed, the canvasser can then go back over the blocks where they placed stuffers the day before and begin their canvassing.

In this way the announcement of

Don't Forget Your Furnace

When You Are Planning Your Spring House Cleaning

A clean furnace is your best guarantee of satisfactory and economical heating. Don't let your furnace go through the destructive summer months full of soot and carbon.

We say "destructive" because the moment the heat is shut off the soot and carbon on the inside of the furnace and the smoke pipe begin to collect moisture. The union of soot and moisture forms rust and destructive acids which cause large repair bills if allowed to remain.

Let us clean your furnace without Muss or Fuss while you can take advantage of our

SPECIAL SPRING CLEANING PRICE

We clean the furnace inside and outside. We remove all soot and carbon before acid action sets in. We remove all dirt from cold air boxes and warm air registers, take all dirt off the basement pipes and paint the furnace front.

Our representative is calling in your neighborhood. He will call on you tomorrow.

If you would like to have him call at some particular time phone us today.

SMITH AND JONES

527 Second Avenue
Phone 340

KEEP THIS HANDBILL—IT ENTITLES YOU TO OUR SPECIAL PRICE

This is a second mailbox stuffer. It is suggested that you print on colored paper, light enough to let the black letters show easily. Sizes of 7 inches by 9 inches or larger are recommended. Both this handbill and the one on the preceding page are written to tie into Spring housecleaning

the service is placed in the mail box on one day and the canvasser calls the following day. The owner is not given time to forget that he got the stuffer and should also remember something about the service you are offering.

This method also provides a distinct tie-up between your stuffer and your canvass in that you can say in effect on the stuffer—We are canvassing in your neighborhood. A representative will call personally tomorrow to explain our service and answer your questions.

This method has been found a desirable way to keep the owner from forgetting your service. The system is now used by some of the largest house-to-house selling organizations in the country. If these firms, from years of house-to-house operation, find it desirable to bring the stuffer and the canvass into close co-operation, the idea must have merit.

Stuffer Design

Let us say, then, that if we want to use stuffers we are going to synchronize our effort as outlined. We

A clean furnace saves fuel because . . .

the soot deposited on the heating surfaces inside your furnace cuts down the amount of heat transferred from the fuel you burn to the air that is circulated through your house

Engineers can tell you exactly how much heat you lose when you have $1/16$ " or $1/8$ " soot on your furnace castings. We can give you those figures, if you want them.

But what you are interested in is the simple and understandable fact that when there is soot (and there is always soot from whatever fuel you burn) a part of that fuel

is wasted because the heat it generates can't do its job of warming the air that it circulated into your house.

In other words, you burn a part of your fuel without getting anything for it. The cost of the fuel you waste in this way will be far more than the cost of cleaning your furnace under our special offer.

You will save substantially on fuel costs by phoning us for our special furnace cleaning price (good until June 1) and by presenting this handbill to our representative who does the job. We'll schedule your cleaning job promptly for the time convenient to you.

Phone NOW for our special offer
PHONE 0000

(YOUR NAME AND ADDRESS)

Keep this handbill—it entitles you to our special price for cleaning your furnace

This third handbill has considerably more reading matter. It fills the need for special stuffers to be sent to people like your old customers who know you and probably will take more time to read your message through. This leaflet might also be used to stuff into letters, bills, statements to customers, or your monthly mailings to old customers or prospects you have already contacted

now want to know just what to say on the stuffer and how such a stuffer should be worded and designed to get a hearing.

Let us remember that on stuffers we want to save money. This will automatically eliminate those tricky pieces of literature which cost money. Such expenditure can be better used for direct mail pieces which will not be immediately followed up by a canvasser.

Remember that all your stuffer calls will not catch the owner in. Some owners will even make it a point to be away from home so that they will not have to see the canvasser. For owners in this frame of mind a different type of mailing piece must be used. A full description of your service, your firm and the savings guaranteed should be contained in this piece. Generally speaking, easy readability is essential. In other words, your message should be in large type, given in as few words as possible.

There is shown with this article three typical and successful mail box stuffers. These have been used practically as shown by a number of contractors with excellent results.

Our original intention was to complete this series on getting cleaning work in three issues. However, so many requests for more detailed information have come in that we are revising some sections in order to give all facts fully. In the next issue we will discuss direct mail literature and return post cards. Typical literature and cards will be shown together with a discussion of how and how not to prepare and mail such literature.

A Hip Molding Pattern

THE development of these sheet metal patterns was requested by a reader of the *ARTISAN*. It might be well to state in the beginning that the final developments of the patterns should, no doubt, be in the form of long strips rather than that shown by the two developments. These strips can be easily laid out from the developed patterns. Space on the drawing does not permit the layout of these strips, but the method will be considered later.

An accurate scale drawing of the plan and elevation of the hood must be made before the two patterns can be developed.

The development of the pattern "P" is comparatively simple. This pattern, as shown in the elevation view, is a quarter of a circle. First divide this pattern up into equal segments, as shown by the lines intersecting the outside arc at points 1, 2, 3, etc., and then bisect each segment. Next, lay out a cross sectional view of this pattern, as shown above the development of the section "P" from the plan and elevation views. Now develop the pattern by developing the segments in the elevation view, using the bissection of each segment as the base line for scaling distances. These bisecting lines are shown in the development of section "P" by the dashed lines perpendicular to the line 1 to 7. The true distances between the lines shown in the elevation view are those on the sectional view of the pattern shown above the development of section "P."

We will now explain how the development of section "P" can be made using long strips of metal instead of the odd shaped pieces, as have been shown. Take the portion of the development 6, 7, 8, & 9 and join it to 5, 6, 10 & 11 by making the line 6-9 coincide with the line 6-10. Then join the portion 4, 5, 12 & 13 to this new piece in the same way, etc., till the six pieces have

By W. R. HAINES

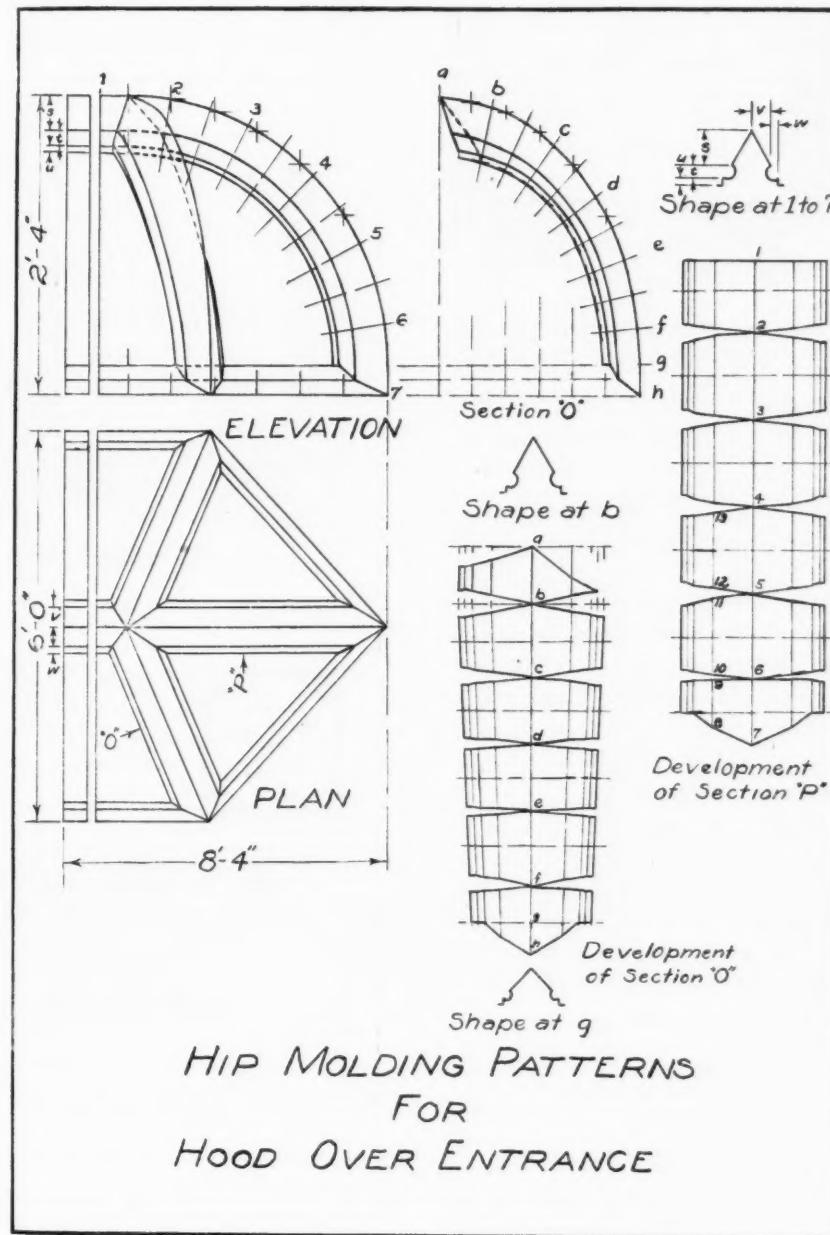
Contributing Editor

been joined together. Now draw a smooth curve through the points 1, 2, 3, 4, 5, 6 & 7, and also through the points on the opposite side of the strip. The other parts of this development are then joined together in the same way, thus making a smooth pattern development that can be easily handled.

Before the pattern "O" can be developed, a side view of the pat-

tern must be drawn. This side view is shown by section "O." First divide the base line for the outside curve 1, 2, 3, 4, 5, 6 & 7 in the elevation view into six equal parts. Now lay out the base for the outside curve a, b, c, d, e, f, g & h, shown by the view section "O," using its distance shown on the plan view as the length of the base. Now divide this base also into six equal parts. Next find the projections of the base intersections on the curve 1, 2, 3, 4, 5, 6 & 7.

(Continued on page 45)



LET IT RAIN



This is a newspaper advertisement published in south side local papers

LET It Rain." Nine years ago, the South Shore Sheet Metal Works in Chicago adopted this slogan as the identifying trademark of the firm and its sales activities.

In those intervening nine years, the slogan has become established in Chicago so that the South Shore company is known throughout its business area by this catchy phrase.

This slogan is copyrighted, and although requests have been received from contractors all over the country who wish to use the slogan, the South Shore company has had to refuse use of the slogan because if one contractor is permitted to adopt it others should also be accorded this courtesy.

Use a Slogan

"This slogan," says John F. Brown, president of the company, "has been made the basis of all our selling and advertising activities.

"LET IT RAIN"

As slogan which a Chicago contractor has established as a household byword ~ ~

We use it on bill boards, in our windows, in all our sales literature. Our constant effort is to identify the South Shore Sheet Metal

Works with this slogan so that even though prospects see the slogan and fail to remember our firm name, the slogan will be so well estab-

THE RAINY SEASON IS FAST APPROACHING
and this is
OUR ANNUAL PLEA

Don't wait until June or July to replace the worn sheet metal and roofing on your building-- **DO IT NOW!**

OUR OFFER
A 10% DISCOUNT will be allowed on all work Accepted before May 30, 1932. Time payments if desired.

Don't set this card aside, just fill in your name and address and drop in any mail box.

Estimates are FREE and we Pay the Postage

DETACH HERE

BUSINESS REPLY CARD

First Class Permit No. 568, Sec. 384½ P. L. & R., Chicago, Ill.

South Shore Sheet Metal Works, Inc.

2214-16 EAST 75th STREET

CHICAGO, ILL.

This is one side of a two sided mailing card sent out in 1932. The solicitation is for roofing and sheet metal repair work. Note how action is demanded by a special discount price

lished that we will get the business.

"We are often asked just how this slogan helps us get business. Our answer always is—that if we can implant in the mind of the prospect some catch phrase, such as, Let It Rain, our continual hammering on this slogan will result in our firm becoming widely known and our services called for.

Mailing Cards

"What we aim to do is to get the prospect to let us repair or replace the sheet metal on his building and then, Let It Rain. Through use of this slogan we aim to keep our name and our slogan before the public, especially all the people who live within the area we serve.

"A large part of the money we appropriate for sales work goes into

We are Working in Your Block Today!

"LET IT RAIN"



The card above is placed in mailboxes of homes in the neighborhood where a job is under way

reply mailing cards. Through the nine years we have been using this

slogan we have built up an active prospect list of some 12,000 names. Every one of these names represents a property owner. These people who own houses, store and apartment buildings are the logical users of our sheet metal service. Sooner or later they need roof and sheet metal repair and replacement work. When this work is necessary we want them to think of us.

"In order to keep our name before these property owners, we mail some type of direct mail literature to each of these persons at least two times a year. Once a year we send out a return card broadcast to a list of some 50,000 names. This

The Chicago Evening Post
211 West Wacker Drive
CHICAGO

GUTTERS
and
ROOFS
for
NEW LOW PRICES
ANNOUNCING

PHONE SOUTH
SHORE 1903 OR

RETURN THIS CARD TODAY

Prices Were Never Lower - - - **Quality Was Never Higher**

Gentlemen:

Without obligation, you may send your estimator to figure the work that I have checked below:

- Repair Roof
- Repair Gutters
- Repair Downspouts
- Repair Furnace

- New Roof
- New Gutters
- New Downspouts
- New Furnace

NAME _____

ADDRESS _____

PHONE _____

NO POSTAGE REQUIRED, JUST FILL IN YOUR NAME AND DROP IN ANY MAIL BOX

This is the other side of the card shown on the opposite page. The receiver is given an opportunity to check off the particular kind of work needed.

Estimates are given without charge

"Let It Rain"
South Shore
Sheet Metal Works
Inc.

75th Street and Luella
South Shore 1903

This small newspaper ad tries to do just one thing—sell the slogan "Let It Rain"

big distribution is not mailed, but placed in mail boxes.

"Our advertising and solicitation work takes several forms. For instance, we now use two large painted outdoor signs located on the

WE ARE REPLACING THE _____

On _____

At _____

THIS JOB IS A GOOD EXAMPLE OF THE FIRST CLASS WORKMANSHIP AND HIGH GRADE MATERIALS USED IN ALL OUR WORK!

PLEASE STOP BY AND INSPECT IT!

We use Keystone Copper Steel exclusively.

DETACH HERE

walls of two buildings. One of these buildings is on a busy intersection, above a filling station. This sign can be seen for a good many blocks, three ways from the corner. This sign costs us \$15.00 a month rental. We do not need night illumination because the bright lights of the filling station light up the sign satisfactorily.

"We have another similar sign near our shop. This costs about the same and is equally satisfactory.

"We do considerable newspaper advertising, much of which is in our local newspapers. In Chicago, there are small weekly and even daily papers which circulate only within a restricted area. It is in papers of this type that we carry such small advertisements as are shown in some of the clippings which I am sending you.

Play Up Slogan

"In all these advertisements, no matter how small, we play up the slogan. In many instances there is little in the advertisement outside of the slogan and our name, address and phone number. While this may, at first thought, seem a waste of money, we have found that when this type of advertising is tied up with all the other direct mail work we do, the reader knows what we do and what we offer. We simply try to keep the slogan and the name before the property owners.

"Contractors may be interested to know that we do not do any cold canvassing. We tried this sort of work and found it did not pay. As a result of our experiments, we have settled on a policy of covering

Above is the back of the card sent through a neighborhood where a job is in progress. The owner is invited to inspect the work

all our area thoroughly with reply cards. When these are filled in and returned we follow up the card im-

mediately or at whatever time is specified, but we do not canvass without preliminary mailing.

"Without doubt our direct mail work has brought in the most business at the lowest cost per job. We spend a lot of time and thought on these reply cards. From our experience we know that if we hope to get a return we must offer some distinctive service and if possible offer it at a time when such a service is likely to prove interesting.

"For example, in the spring house gutters and downspouts are pretty sure to need some service. Perhaps all that is required is cleaning and soldering up holes. In many cases, however, new lengths of gutter and pipe are needed and also attention to flashings and roofs.

"Knowing that the early spring is a good time to get such work, we

Here is a New Wrinkle
IN THE ASPHALT SHINGLE AND SHEET METAL FIELD

We will replace all of the sheet metal or roofing on your building

For Only \$10.00 Down

No Change in Workmanship .. No Change in Materials
No Carrying Charges .. No Interest Charges

ACT NOW! THEN LET IT RAIN

SOUTH SHORE SHEET METAL WORKS
Incorporated
2214-16 E. 75th STREET CHICAGO

We use Self Vulcanizing Shingles and Keystone Copper Steel Exclusively

DETACH HERE

— AND NOW
YOU CAN

LET IT RAIN

FOR

\$10.00 Down



Above are two sides of another four sided return mailing card. The drive last year, when this was sent out, was for part time payment work

make a heavy mailing of return cards early in the spring. In most of these we call attention to the fact that after a winter season cleaning, repair and replacement should be done before heavy rains set in. We call attention to the possible dangers from letting such work go without attention. We also make special offers effective within a time limit to get the owner to act immediately.

"We have, of course, had to offer terms on work which runs into any sizeable amount of money. To in-

Contracting and
Plant Maintenance

"LET IT RAIN"

SOUTH SHORE SHEET METAL WORKS

2216 East 75th Street

JOHN F. BROWNE

South Shore
1903

duce owners pressed for cash to get their work done at once, we make special offers of so much down and so much at definite intervals. This partial payment plan has assisted materially in keeping our forces occupied in spite of lack of money.

The rainbow is not, of course, always hanging over the shop of South Shore Sheet Metal Company, but this illustration is used in some of the advertisements

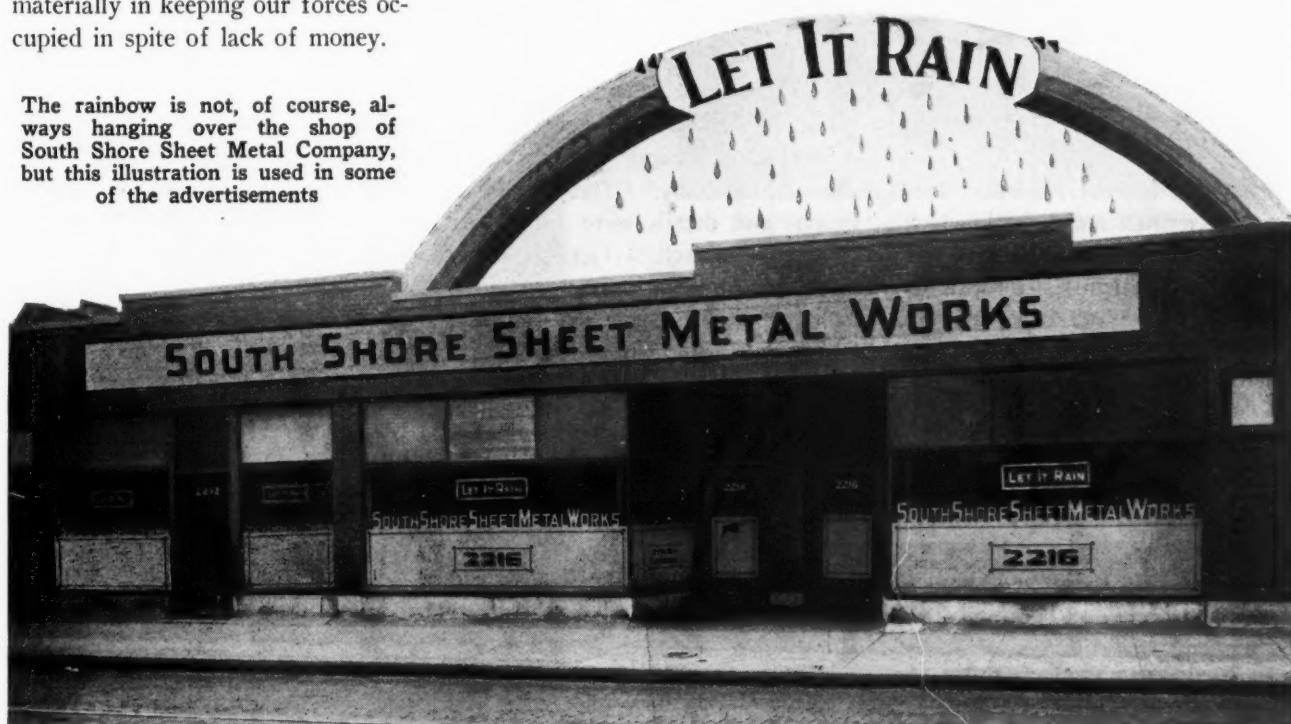
Another newspaper advertisement. This, like the other, takes only a small space. Two things are advertised—the firm name and the slogan "Let It Rain." Consistency has gained recognition for both

mean that when we get a job in a certain block we place in the mail box of all the owners in the same block, across the street and for perhaps a block or two on either side

of the job a special folder which calls attention to the work we are doing in that locality. As noted on a typical card of this character we call attention to the quality and workmanship on this job. Of course, we live up to our reputation.

"We do roofing work as a matter of course. When we are called in on a sheet metal repair job we inspect the roof and if we find leaks or places where patching should be done we recommend such work and stress the saving to be made by having the work done while our men are on the roof. As a result of our efforts to get roofing work, about one-half of our jobs now contain a full or part contract for roofing.

"We cannot lay too much emphasis on the idea of adopting a slogan. If a contractor will think up a short, easy-to-remember slogan and use this on all his mail, sales and advertising work I feel sure that the contractor will find such a slogan pays."



LET IT RAIN
SOUTH SHORE SHEET METAL WORKS
ROOFS AND GUTTERS
2214 East 75th Street
Phone South Shore 1903

This advertisement was used on special pages where all contractors working on a particular job advertised jointly. These did not pull very well

"To our way of thinking, one of the most interesting developments of this direct mail solicitation has been the efforts made to capitalize on work in progress. By this I



Germany Adopts Sheet Metal For Exterior Remodeling

ARCHITECTURAL papers have for several months past featured the excellent metal work being done on German buildings. Details of this work have been discussed widely and most American sheet metal contractors are familiar with the details of construction and design.

There is, however, another feature of German metal work which has not been so widely publicised—the use of metal in sheet form for covering walls and roofs of old buildings.

In many ways this use of sheet

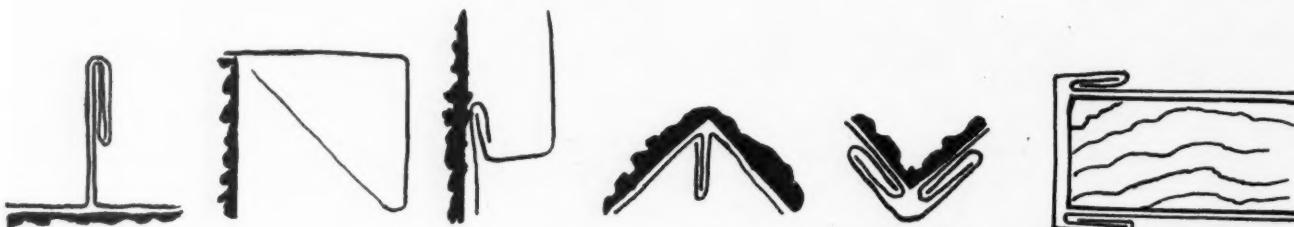
metal conforms with standard American practice, but in the use of different metals on the same building, or, rather, adjoining each other on the same wall, German practice has advanced beyond us.

The photographs with this article show some of the construction details of a typical "overcoating" job in Germany. These photographs and details were furnished by Hans Reinsch, a German intimately familiar with metal working in his country.

"Most of owners of old buildings in Germany," says Mr. Reinsch,

"complain of high maintenance costs in frame and masonry buildings. Also the problems of weathering are as severe in Germany as in other countries. In spite of what in America would be termed low material and labor costs, renovating and repair is an expensive item to the average German property owner. For safety, damaged street fronts must be watched for negligence which may result in injury to passers-by.

"Of course, many remedial methods have been perfected, but probably the most interesting method



From left to right—Stand-up fold, three fold over, lying fold, fold for reversed edge, fold on stiffened forward edge, over-pinched border

now in use is the fitting of a metal covering to the entire building. This method of metal sheathing has been practiced for many years. Originally metal was used on the weather exposed sides and repairs counted on to keep less exposed sides in good condition.

"Now, however, German architects and builders have gone another step and are specifying metal sheaths for entire buildings.

"These metal walls take several forms. For example, roofs are being covered with metal shingles, in some cases made as individual shingles, in other cases as shingle formed pieces of metal several shingles long or even in strips as long as the width of the roof. Other forms of roof covering are the usual sheets locked by standing seams, which here we call 'stand up folds.' These sheets run from eave to ridge.

"Recently still another form of roofing application has become popular. In this form the metal is applied in long strips across the width of the roof with the strips joined by a 'lying fold' or a 'three fold over.'

"On side walls several methods are now in vogue. Perhaps the

most pleasing wall is made by applying the sheet metal in long horizontal strips or 'straps,' as we call them. We can obtain sheets in most metals as long as 70 meters. In joining the sheets on walls not as much attention has to be paid to water penetration as on a roof, hence we use several types of fold, some of which are really more decorative than utilitarian, yet we have found that such seams exclude moisture and have the advantage of permitting easy expansion and contraction. Such expansion is required in using zinc, which is a popular material, or in using two or

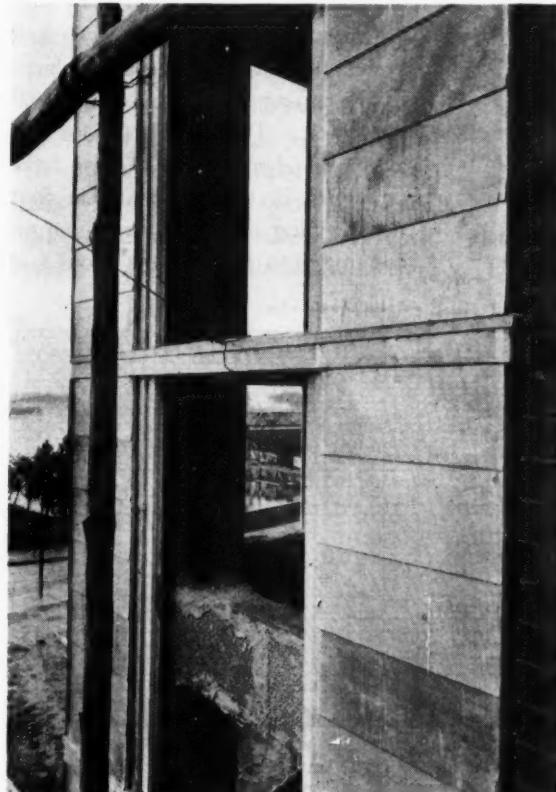
more different kinds of metals on the same wall. Loose joints eliminate most of the trouble from different coefficients of expansion.

"In most applications the sheets or straps are held in place on the wall by galvanized sheet 'clamps' which are turned into the fold and nailed to the wall behind the sheet.

"One of the commonest forms of seam is an 'S-shaped roll.' We also use the 'three fold' which is similar to your double seam.

"Another fold is the 'lying fold' in which the lower edge of the upper sheet is turned twice at right angles, while the upper edge of the

Right—A sheathed metal job with horizontal roof sheets locked "three fold over." Side "straps" are locked with a "lying fold." Note the hip construction



Another sheathing application. "Straps" here are locked "three fold." The corner is fabricated with a "stand-up-fold." Note the timber scaffolding

lower sheet is rolled outside as you would form a bead. The two edges are slipped together and held to the wall by the clips. This makes an even heavier butt.

"In many instances, today, we are applying metal to outside surfaces without paint. Even where copper and zinc and aluminum and galvanized iron are used together or in combination on a building no paint is used. To get an attractive appearance we are depending upon natural oxidation to color the sheets, each to its own peculiar color."

FAN BLAST ENGINEERING

by PLATTE ENGINEERING O V E R T O N EDITOR



BRANCH TAKEOFFS

THE two charts "main and branch pipes for equal friction per foot of length" shown with this article require some revision when applied to unusual problems.

It must be remembered that these charts are applicable where all the branches have nearly the same length and the same number of el-

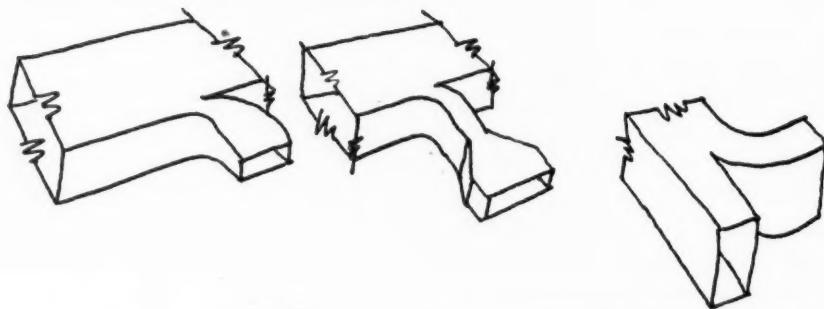


FIG 2

Here are three typical branch takeoffs. The important thing to do is to use the same type for all the branches in one system

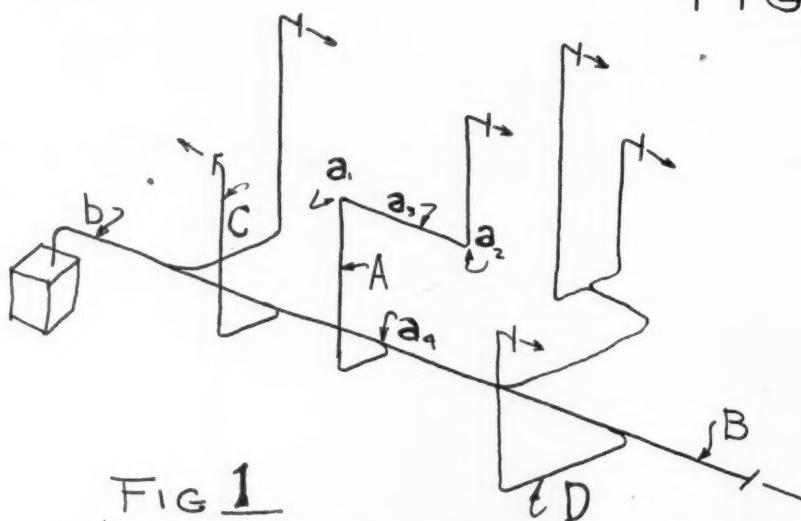
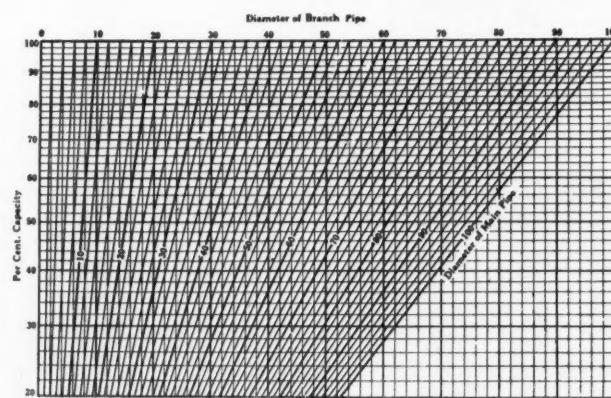
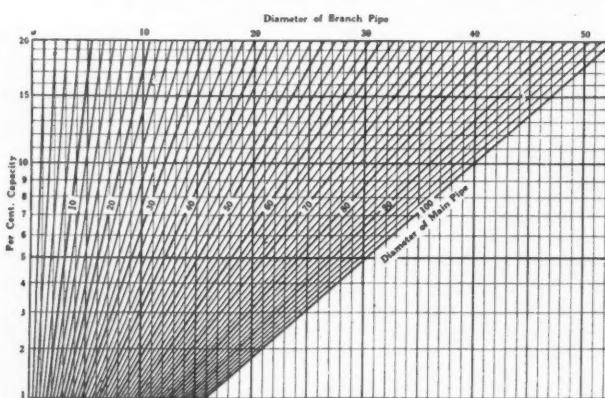


FIG 1

This diagrammatic sketch shows a typical house piping plan in which branch lengths vary considerably and the charts below must be revised



Above are two charts showing the diameter of branch pipes necessary to carry given percentages of the total air carried in the main pipe with the same friction per foot of length. To use the charts, determine what percentage of air you want the branch pipe to carry; find this percentage at the left; move across to the right until you intersect the size of the main; read directly above at the top the diameter required in the branch

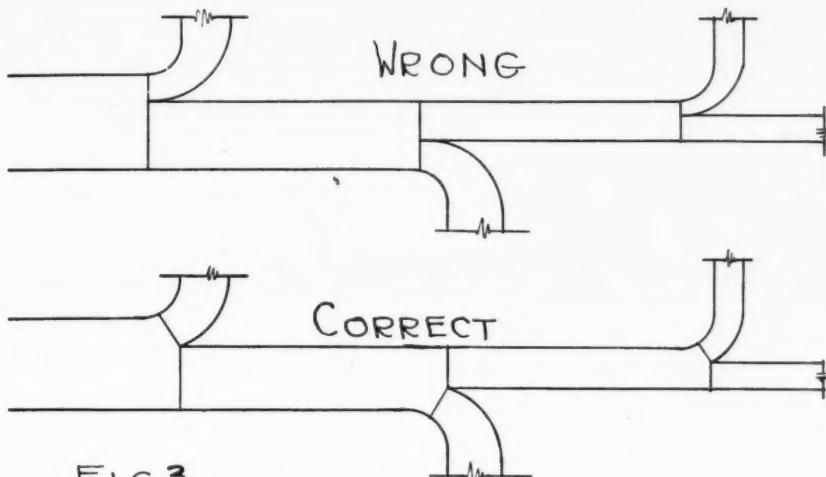


FIG 3

The two sketches above show a wrong and a right branch takeoff. Be sure all throat radii are the same dimensions

we note that there are no elbows, offsets, or branch take offs, and it is obvious that if the chart is followed for the sizing of this duct the inlet at *B* will get more than its quota of air.

Here is the logical place for a volume damper and the only one needed for the system. It is possible to size this run to the correct dimensions, but as this incurs some complicated formula we advise the use of the volume damper for the average designer. For those who have the necessary mathematical knowledge this chart is based on the assumption that the coefficient of friction varies inversely as the $1/7$ power of the capacity.

As the pressure will vary from *D* to *B* it is evident that the branches *C* will get more air than *D* if they are both sized the same, but the difference will not exceed 2 or 3% and may be disregarded. The prob-

lem for *A* is more complicated. Roughly we should add 10% for each elbow and 10% for each 10 feet of pipe and we have: $a_1 + a_2 + a_3 = 30\%$ to add to the size of the duct opening from the main at *a*.

We now come to the questions of branch take offs. There are various designs, some of them shown in Figure 2. Any of them may be used, but *for a given trunk line and branches, design all take offs in the same manner and with the same radius of throat*. This is pictured in Figure 3.

When we determine the size of the branch pipe from the charts, this obtained size is the dimensions of the opening from the main. Let us say we have a main 18x8. Our branch size is 6x8 and our main continues on at 14x8. Lay the steel square as shown in Figure 5 and draw the end down until we have the dimension 6 inches and we have the top dimension of the branch opening. The height of course is the duct height—or 8 inches.

The branch from the take off may be the same size as the opening from the main or a little larger, but the opening from the main is the important item.

Figure 3 explains the right and wrong methods. Some contractors complain that the "right" method requires a waste of material. Figure 4 is an example of the method to use to save material and obtain the best results.

Make a tentative diagram as shown in Figure 1 before making the calculations for the duct dimensions. Prepare a detailed drawing of the complete duct system for the sheet metal shop and see that they follow it. If you subcontract your sheet metal work, remember that the cheapest contractor is not al-

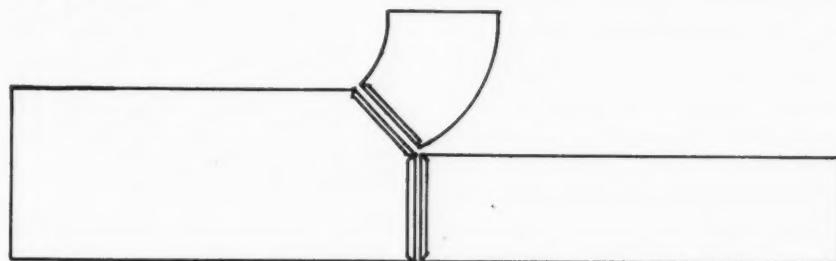


FIG 4

Above is a sketch showing how to design a takeoff to save material and obtain best results

Left is shown a short method of getting the throat width when sizes have been determined from two charts shown on the opposite page. The height remains constant along the duct

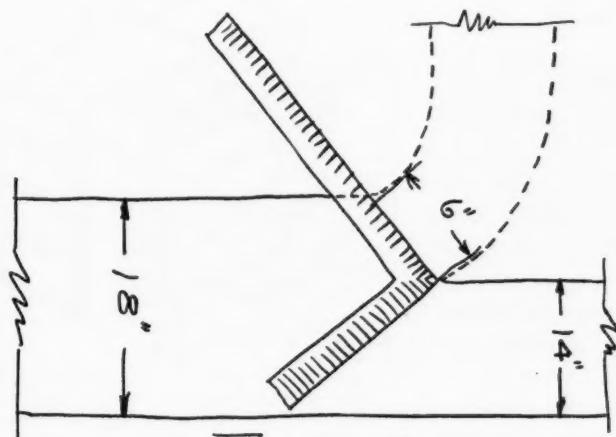


FIG 5

ways the best one. In the event that changes must be made in the layout insist that such changes must have your approval. But study all the conditions before the layout is made and arrange with the plumber, electrician or gas fitter to work together. Make a few changes to favor them and see that they make more changes to favor you. Your system is more important than theirs. They may install elbows, etc., with no damage to their systems. You can not. Be polite, but get your system in the best way.

BASIC PRINCIPLES OF HEATING

HEAT TRANSMISSION COEFFICIENTS

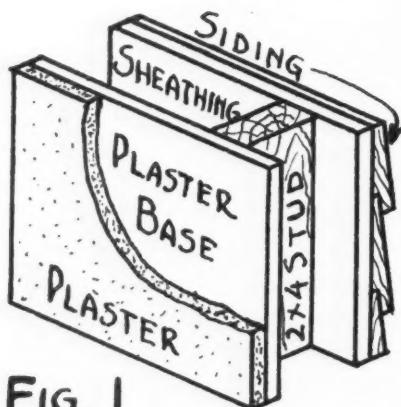


FIG. 1

Every square foot of an exterior wall of this construction will permit 0.27 B.t.u. (27/100 of a B.t.u.) per degree difference, per hour to pass from inside to outside.

WITH an outdoor temperature one degree lower than the inside temperature (room temperature) and with a wind blowing at 15 miles per hour, it has been found by experiment that the quantity of heat transmitted (lost) from a room through one square foot of single window glass in one hour, is 1.1 B.t.u.

This is true not only for one degree of temperature difference between inside and outside, but it is true for *each* degree of such difference. Thus if the inside temperature is 60 degrees Fahr. and the outside temperature 40 degrees, giving a 20-degree difference, the rate of heat loss through one square foot of window glass is $20 \times 1.1 = 22$ B.t.u. per hour; for a 70-degree difference it is $70 \times 1.1 = 77$ B.t.u. per hour, etc.

Heat Transmission Coefficients

This value (1.1 B.t.u.) is called the "heat transmission coefficient" of single window glass. Similar coefficients have been determined

for all the more common types of walls, ceilings, roofs—in fact, for practically all surfaces through which heat is ordinarily transmitted (lost) from a room or building.

The following definition is important and should be understood by everyone engaged in any class of heating work:

The quantity of heat, expressed in B.t.u. per hour, which is transmitted through one square foot of a given building construction for each degree difference between inside and outside temperatures, is called the *heat transmission coefficient* of that construction.

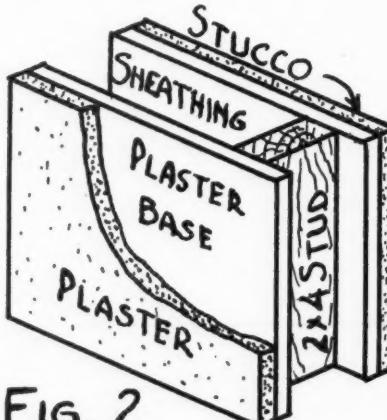


FIG. 2

Every type of wall construction has its particular coefficient of heat transmission. The coefficient for this combination is 0.31 B.t.u. per hr., per degree, per sq. ft.

Such heat transmission coefficients for several thousand types and thicknesses of walls, ceilings, floors, etc., have been determined and are published in various text and reference books. Abridged tables of coefficients are issued also by some manufacturers of heating equipment and by manufacturers of insulating materials.

The most complete and probably the most accurate table is in the

By G. A. Voorhees

"Heating and Ventilating Engineers Guide," a copy of which every progressive heating contractor should have. It is published by the American Society of Heating and Ventilating Engineers, 51 Madison Avenue, New York City, from which office anyone can obtain a copy for \$5.00.

Determining Coefficients

Occasionally a type of construction will be met for which no transmission coefficient is given in any published table. In that case, the coefficient may often be quite accurately estimated by comparing the actual construction with similar constructions for which coefficients are published—or it can be more definitely determined by computation.

The method of arriving at the correct coefficient by computation is based on the conductivities of the several separate items of material that enter into the construction of the wall or other heat transmitting surface in question. The detailed instructions for making the neces-

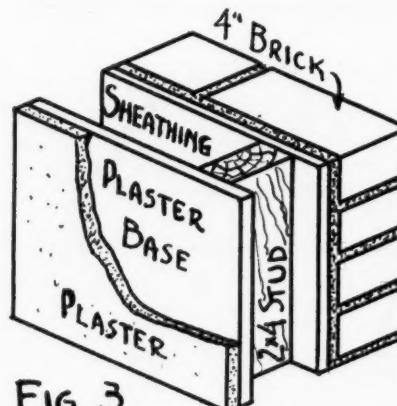


FIG. 3

The table on page 3 of this article gives 0.25 as the coefficient for this wall

sary calculations together with the required data on conductivities as determined in tests made by the U. S. Bureau of Standards and other authorities, are too lengthy to be included here, but may be found in the Heating Engineers Guide.

To illustrate the practical use of heat transmission coefficients, let us suppose we want to know how much heat will be lost by transmission through 75 square feet of exposed wall consisting of 1-in. stucco, $\frac{1}{8}$ -in. wood sheathing, 2-in. \times 4-in. studding, lath and plaster, with a room temperature of 70 degrees Fahr. and an outside temperature of 10 degrees below zero.

From a standard table of heat transmission coefficients we would find that the coefficient for this particular construction is 0.31, and according to our previous definition of such a coefficient it is evident that the heat transmission loss through *each square foot* of this exposed wall amounts to 0.31 B.t.u. per hour for *each degree* of temperature difference between inside and outside.

With 70 degrees inside and 10 degrees below zero outside, our temperature difference is 80 degrees and the hourly heat loss will be $80 \times 0.31 = 24.8$ B.t.u. per square foot of surface. Through 75 square feet of surface the total loss then would be $75 \times 24.8 = 1,860$ B.t.u. per hour.

Heat Loss Factor

If we were figuring the heat losses of a number of rooms in one

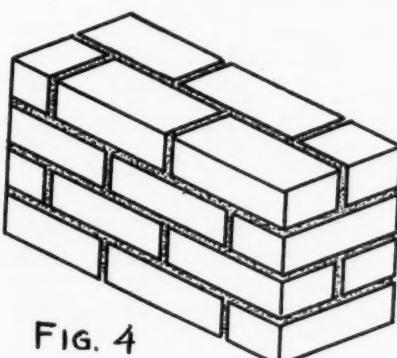


FIG. 4

Coefficients may be figured by adding up the coefficients of all the different materials in the wall. The coefficient of this brick wall is 0.39

building, the construction of the *exposed* wall would usually be the same for each room; also the room temperature and consequently the difference between inside and outside temperature would probably be the same for each room. Therefore it would be a waste of effort to multiply the heat transmission coefficient by the temperature difference as each room is figured. These two factors can be combined and their

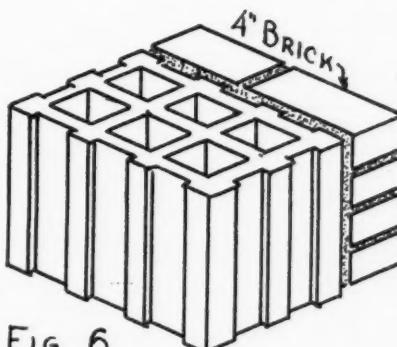


FIG. 6

Brick and tile is a combination showing a favorable transmission—0.27, which compares well with wood

product multiplied by the exposed wall area for each room.

Thus in the example just given, if we had several rooms having re-

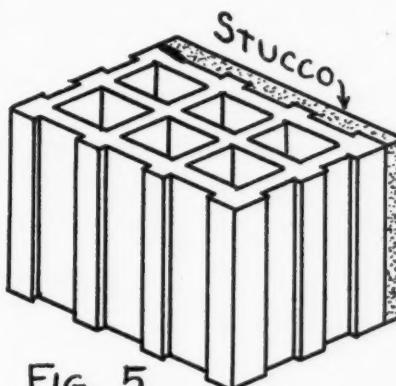


FIG. 5

Here is a popular wall, stucco on clay tile. Its ability to transmit heat is shown by its coefficient 0.32

spectively 75 sq. ft., 195 sq. ft., 112 sq. ft., 88 sq. ft., etc., instead of performing the multiplications indicated by—

$$\begin{aligned} 75 \times 80 \times 0.31 \\ 195 \times 80 \times 0.31 \\ 112 \times 80 \times 0.31 \\ 88 \times 80 \times 0.31 \text{ etc.} \end{aligned}$$

we would lessen our work and at

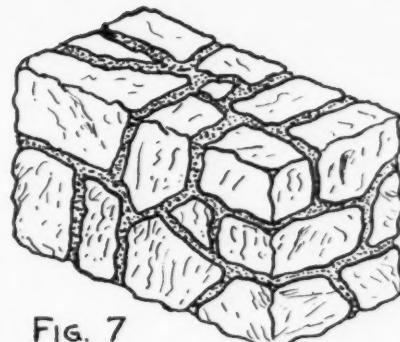


FIG. 7

Stone walls are generally porous—mostly through the mortar joints. The coefficient of this wall is 0.56

the same time reduce the possibility of arithmetical errors by simplifying the calculations, thus:

$$\begin{aligned} 75 \times 24.8 \\ 195 \times 24.8 \\ 112 \times 24.8 \\ 88 \times 24.8 \text{ etc.} \end{aligned}$$

The factor 24.8 is the product of the two factors 80 degrees temperature difference and 0.31 B.t.u. per degree heat transmission. This product is called the "heat loss factor" and it is evident that for any type of wall, floor, roof or other surface through which heat is lost, such a heat loss factor can be used to simplify the calculations when the heat transmission coefficient and the temperature difference are known.

Heat Loss Tables

Although such tables of heat loss factors are seldom published, many engineers have prepared them for their own use as a convenience in making calculations. The accompanying table is a part of one which the writer has used for some time and has found quite helpful in eliminating unnecessary calculations.

Most of the factors in this table are based on the transmission coefficients published in the Heating and Ventilating Engineers Guide; some are taken from other authorities believed to be reliable and some have been obtained by computation based on conductivities of building materials determined by the U. S. Bureau of Standards.

Following is a table which saves much calculation.

Table of Factors

This table which follows gives heat loss factors in B.t.u. per hour per square foot of exposed surface for inside-outside temperature differences of 50 degrees, 60 degrees, 70 degrees and 80 degrees. Factors

for other temperature differences are as follows:

For 25 degrees, one-half of 50-degree factor.

For 30 degrees, one-half of 60-degree factor.

For 35 degrees, one-half of 70-

degree factor.

For 40 degrees, one-half of 80-degree factor.

For 90 degrees, 1.5 times 60-degree factor.

For 100 degrees, 2 times 50-degree factor.

Sec. TYPE OF CONSTRUCTION**A GLASS SURFACE:**

Windows, outside doors, skylights.....
Windows with well fitted storm sash.....

HEAT LOSS FACTOR

for difference between
inside and outside
temperature of

	50 deg.	60 deg.	70 deg.	80 deg.	Heat Transmission Coefficient
Windows, outside doors, skylights.....	55.0	66.0	77.0	88.0	1.1
Windows with well fitted storm sash.....	30.0	36.0	42.0	48.0	0.60

B FRAME WALLS (Figure 1):

Siding (clapboards or shingles), studding, lath and plaster.....
Siding, paper, studding, lath and plaster.....
Siding, studding, paper board.....
Siding, wood sheathing, studding, lath and plaster.....
Siding, $\frac{1}{2}$ -in. fibre board (instead of wood sheathing), studding,
lath and plaster

22.0	26.4	30.8	35.2	0.44
19.0	22.8	26.6	30.4	0.38
23.0	27.6	32.2	36.8	0.46
13.5	16.2	18.9	21.6	0.27
11.5	13.8	16.1	18.4	0.23

C STUCCO FRAME WALLS (Figure 2):

Stucco, wood sheathing, studding, lath and plaster.....
Same with $\frac{1}{2}$ -in. fibre board substituted for wood sheathing.....

15.5	18.6	21.7	24.8	0.31
12.5	15.0	17.5	20.0	0.25

D BRICK VENEER FRAME WALLS (Figure 3):

Brick, wood sheathing, studding, lath and plaster.....
Same with $\frac{1}{2}$ -in. fibre board substituted for wood sheathing.....

12.5	15.0	17.5	20.0	0.25
11.0	13.2	15.4	17.6	0.22

E STEEL SIDING FRAME WALLS:

Flat sheet iron on studding.....
Corrugated iron on studding.....
Corrugated iron, studding, plaster board.....

60.0	72.0	84.0	96.0	1.20
75.0	90.0	105.0	120.0	1.50
45.0	54.0	63.0	72.0	0.90

F 8-IN. BRICK WALLS (Figure 4):

Plain, no interior finish.....
With $\frac{1}{2}$ -in. plaster on brick.....
With lath and plaster, furred.....
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....

19.5	23.4	27.3	31.2	0.39
18.0	21.6	25.2	28.8	0.36
13.0	15.6	18.2	20.8	0.26
9.5	11.4	13.3	15.2	0.19

12-IN. BRICK WALLS:

Plain, no interior finish.....
With $\frac{1}{2}$ -in. plaster on brick.....
With lath and plaster, furred.....
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....

15.0	18.0	21.0	24.0	0.30
14.0	16.8	19.6	22.4	0.28
9.0	10.8	12.6	14.4	0.18
7.5	9.0	10.5	12.0	0.15

G 8-IN. HOLLOW TILE, STUCCO OUTSIDE (Figure 5):

Plain, no interior finish.....
With $\frac{1}{2}$ -in. plaster on tile.....
With lath and plaster, furred.....
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....

16.0	19.2	22.4	25.6	0.32
15.0	18.0	21.0	24.0	0.30
11.5	13.8	16.1	18.4	0.23
8.5	10.2	11.9	13.6	0.17

10-IN. HOLLOW TILE, STUCCO OUTSIDE:

Plain, no interior finish.....
With $\frac{1}{2}$ -in. plaster on tile.....
With lath and plaster, furred.....
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....

15.0	18.0	21.0	24.0	0.30
14.5	17.4	20.3	23.2	0.29
11.0	13.2	15.4	17.6	0.22
8.0	9.6	11.2	12.8	0.16

Sec.	TYPE OF CONSTRUCTION	HEAT LOSS FACTOR				Heat Transmission Coefficient
		50 deg.	60 deg.	70 deg.	80 deg.	
	12-IN. HOLLOW TILE, STUCCO OUTSIDE:					
	Plain, no interior finish.....	12.0	14.4	16.8	19.2	0.24
	With $\frac{1}{2}$ -in. plaster on tile.....	11.5	13.8	16.1	18.4	0.23
	With lath and plaster, furred.....	9.5	11.4	13.3	15.2	0.19
	With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	7.5	9.0	10.5	12.0	0.15

H 6-IN. HOLLOW TILE WITH BRICK VENEER (Figure 6):

Plain, no interior finish.....	13.5	16.2	18.9	21.6	0.27
With $\frac{1}{2}$ -in. plaster on tile.....	12.5	15.0	17.5	20.0	0.25
With lath and plaster, furred.....	10.0	12.0	14.0	16.0	0.20
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	8.0	9.6	11.2	12.8	0.16

I 8-IN. HOLLOW TILE WITH BRICK VENEER:

Plain, no interior finish.....	13.0	15.6	18.2	20.8	0.26
With $\frac{1}{2}$ -in. plaster on tile.....	12.0	14.4	16.8	19.2	0.24
With lath and plaster, furred.....	9.5	11.4	13.3	15.2	0.19
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	7.5	9.0	10.5	12.0	0.15

10-IN. HOLLOW TILE WITH BRICK VENEER:

Plain, no interior finish.....	12.5	15.0	17.5	20.0	0.25
With $\frac{1}{2}$ -in. plaster on tile.....	12.0	14.4	16.8	19.2	0.24
With lath and plaster, furred.....	9.0	10.8	12.6	14.4	0.18
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	7.5	9.0	10.5	12.0	0.15

12-IN. HOLLOW TILE WITH BRICK VENEER:

Plain, no interior finish.....	10.5	12.6	14.7	16.8	0.21
With $\frac{1}{2}$ -in. plaster on tile.....	10.0	12.0	14.0	16.0	0.20
With lath and plaster, furred.....	8.0	9.6	11.2	12.8	0.16
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	6.5	7.8	9.1	10.4	0.13

J 8-IN. LIMESTONE OR SANDSTONE (Figure 7):

Plain, no interior finish.....	28.0	33.6	39.2	44.8	0.56
With $\frac{1}{2}$ -in. plaster on stone.....	25.0	30.0	35.0	40.0	0.50
With lath and plaster, furred.....	16.0	19.2	22.4	25.6	0.32
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	11.5	13.8	16.1	18.4	0.23

10-IN. LIMESTONE OR SANDSTONE:

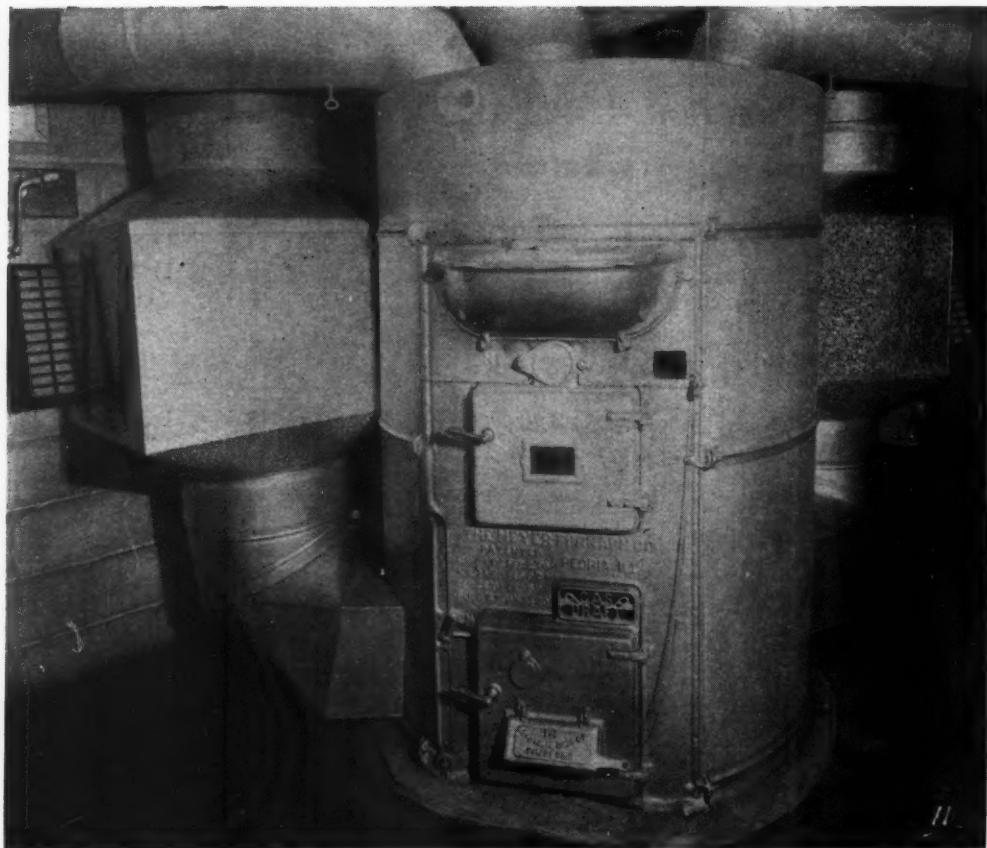
Plain, no interior finish.....	25.0	30.0	35.0	40.0	0.50
With $\frac{1}{2}$ -in. plaster on stone.....	22.5	27.0	31.5	36.0	0.45
With lath and plaster, furred.....	15.0	18.0	21.0	24.0	0.30
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	11.0	13.2	15.4	17.6	0.22

12-IN. LIMESTONE OR SANDSTONE:

Plain, no interior finish.....	23.0	27.6	32.2	36.8	0.46
With $\frac{1}{2}$ -in. plaster on stone.....	21.0	25.2	29.4	33.6	0.42
With lath and plaster, furred.....	14.5	17.4	20.3	23.2	0.29
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	10.5	12.6	14.7	16.8	0.21

16-IN. LIMESTONE OR SANDSTONE:

Plain, no interior finish.....	19.5	23.4	27.3	31.2	0.39
With $\frac{1}{2}$ -in. plaster on stone.....	18.0	21.6	25.2	28.8	0.36
With lath and plaster, furred.....	13.0	15.6	18.2	20.8	0.26
With $\frac{1}{2}$ -in. plaster on $\frac{1}{2}$ -in. fibre board, furred.....	9.5	11.4	13.3	15.2	0.19



A New Merchandising Idea— FILTERS IN GRAVITY SYSTEMS

WE have been hearing much these past few months of an astonishing new idea—the application of filters to gravity furnace installations.

To many of us, this idea may come as something of a shock, for it upsets another of the basic principles upon which our industry has been operating since the formation of the research program at the University of Illinois.

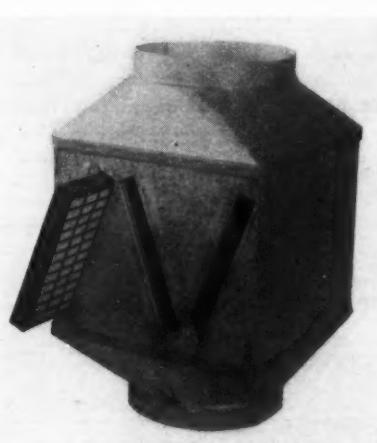
Nevertheless, so many established principles have been upset lately by the introduction of new products and new methods of using old products, that the furnace industry is pretty well accustomed to view these revolutionary developments as matter of course and judge them on their merits as builders of business.

That this newest idea holds possibilities of vast importance to the furnace dealer is easy to visualize when we picture the huge market

for this service—the millions of gravity furnace installations doing service all over the country. And when we add to this fact that fighting dust and dirt is one thing every housewife in the country is vitally interested in, this idea of filters for gravity plants becomes breathtaking.

Two developments in research have made this new idea practical. The first of these is the establishment of the principle that if you present enough filter area to the air flow, air will seep through and diminish velocity only slightly.

The second development is even more important because regardless of area, most filters designed specifically for use with fans will not pass air under low gravity velocity



This shows the filter box developed from experiments on the plant shown above

and pressure. This second development, then, is the perfecting of a new type filter which is so constructed that air can pass through under low pressures and velocities and at the same time do a filtering job.

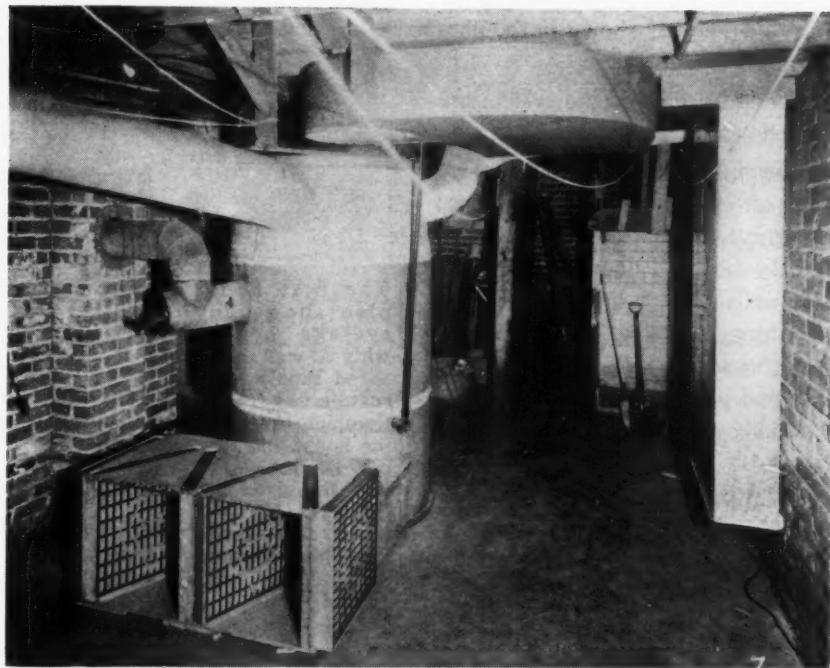
A filter of this type now on the market was brought out by the Owens-Illinois Glass Company of Toledo, Ohio.

Research Development

This idea and the filter has been under test by a number of practical heating contractors in several localities for months. The things they have found out about the proper application of the filters, the proper filter area, the best placing of the filter units in a typical return air system, and how to sell the idea to the housewife, can now be related.

When we applied filters to fan systems the area of the filter had to be only slightly larger than the area of the fan intake or of the return air area. With the fan pushing air, the filter area was not so important.

Working on gravity, however, these principles will not hold true. The principle of gravity application is to provide so much filter area that air can take longer to work through, meanwhile keeping sufficient air al-



For open basement return this filter case proved efficient and compact

ways going through to maintain the velocity and pressure necessary to keep air moving through the casing.

Months of testing on all kinds of gravity systems has established the general principle that the filter area must be approximately five times the total warm air pipe area. If this ratio is maintained, there will be no measurable resistance to air flow.

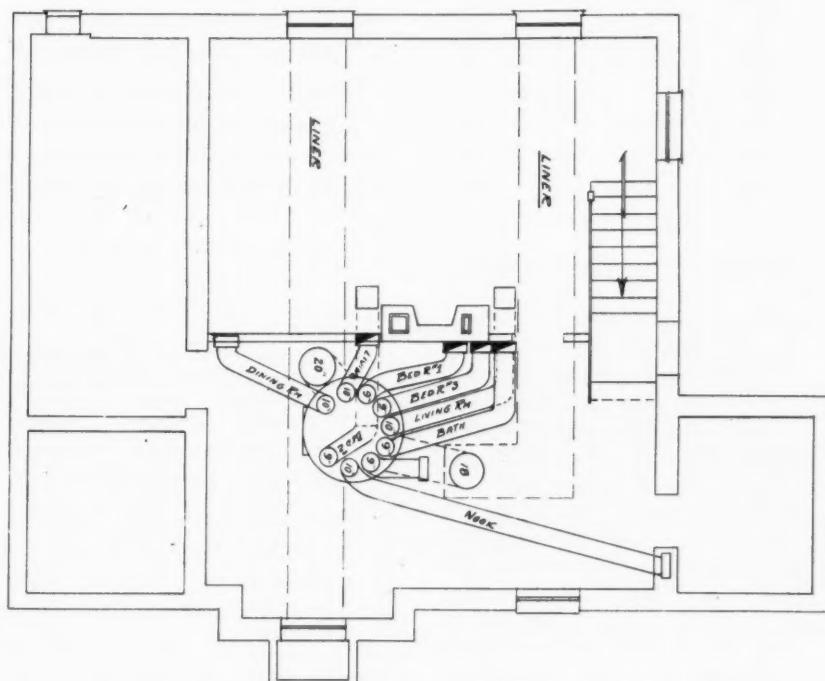
The application of this principle of filter area, required months of

experimenting to workout the most economical and practical means for housing the filters. Just placing the filters end to end or back to back did not do, because so large an area made a highly unsightly cabinet in the basement. Many types of housing were tried, resulting in a square, box-like cabinet which is made a part of the return cold air pipe. This box cabinet or boot is placed as high on the return air pipe as possible to get it off the floor and out of the way.

Standard Code Job

One of the photographs of an installation made shows just how a five section filter boot appears. The construction of the boot is very simple. The photo also shows how the filters are placed in the air flow. The arrangement can be varied to accommodate three, four, or five filters, depending upon the size of the return.

One installation in particular has been made the subject of highly interesting tests. This installation is shown in the photograph and also in the floor plans of the house. It is a typical small residence, having a gravity system which works satisfactorily. The only change made in the system was the incorporation



The piping system of the house on which the tests were run

of the two filter boots in the two return air pipes, as shown in the photograph.

General details of the system are as follows:

Description of residence: Two story and basement. Ceiling heights: Basement, 7 feet; first floor, 8 feet 8 inches; second floor, 8 feet. Outside walls: 4-inch brick with paper, sheathing, studding, lath and plaster (brick veneer). Ceiling with lath and plaster, no floor nor insulation above. Windows: Steel casements.

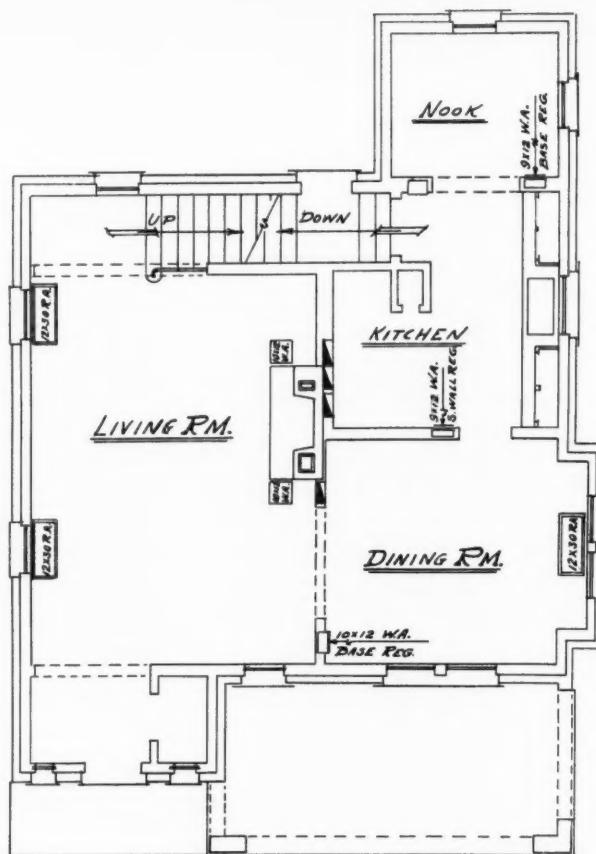
Establish Area

Warm air leader pipe sizes determined by the following standard code formulas:

Glass surface divided by 12. Outside wall surface divided by 68. Ceiling area divided by 50, and cubical contents divided by 800. Total multiplied by 9 on first floor, and by 6 on second floor. Fifteen per cent added to rooms having northeast and northwest exposures, and 10 per cent added to bathroom.

Return air taken from two locations in living room and from one place in dining room, all returned to

The first floor plan shows an average house with a well balanced supply and return system. Complete data on the house and for the heating system are given in Table I. No returns are taken from the second floor



what effect the filters had. These results are tabulated in Table II.

Four separate readings were made with bonnet temperatures of 181, 183, 185, and 188. During the

tests the outside temperature was 28 degrees and inside temperature 71 degrees to 73 degrees, average temperature difference 44 degrees, wind velocity 12 m.p.h. from northwest.

These tests establish two important facts. First, is the fact that register velocities are reduced to a very slight degree which means that the rooms will be adequately heated and also the air will be cleaned.

Second, if this house is considered typical, the tests show that the furnace man now has something to sell which has an almost limitless

(Continued on page 45)

TABLE I

Room	Glass sq. ft.	Wall sq. ft.	Ceiling sq. ft.	Contents cu. ft.	Reqd. pipe area	Pipe size used	Area pipe used
Living	84	408	54	2281	153	2-10	158
Dining	26	178	---	1071	63	1-10	78
Kitchen	6	83	---	892	27	1-8	50
Nook	14	109	50	425	52	1-9	63
Bed No. 1.....	18	170	138	1104	48	1-9	63
Bed No. 2.....	18	174	142	1136	48	1-9	63
Bed No. 3.....	14	142	95	760	42	1-8	50
Bath	6	112	49	392	39	1-9	63
Totals.....				472		588	

furnace through one 18-inch and one 20-inch pipe, the two having a combined area of 568 inches.

Furnace, steel, 24-inch drum with rated warm air pipe capacity of 541 inches. Complete data is given in Table I.

Before the filters were installed, air tests were conducted to establish operation date. Then the filters were installed and while the system operated under similar conditions other tests were run to show just

TABLE II

Room	Type : reg.	Size reg.	Vel. f.p.m. with filters	Vel. f.p.m. without filters	Vel. loss f.p.m. with filters	Percentage loss f.p.m. with filters
Living No. 1....	FL	10x12	123	127	4	3.1
Living No. 2....	FL	10x12	187	189	2	1.0
Dining	BB	10x12	136	142	6	4.2
Kitchen	SW	9x12	163	168	5	2.8
Nook	SW	9x12	155	157	2	1.3
Bed No. 1.....	BB	9x12	60	62	2	3.3
Bed No. 2.....	BB	9x12	99	108	9	8.4
Bed No. 3.....	SW	9x12	165	169	4	2.7
Bath	SW	9x12	122	128	6	4.7
Totals.....			1210	1250	40	31.1 or 3.46

What Is Merchandising?

By Mat. Friedman

"JUST What Is Merchandising?" Is it newspaper advertising? Is it house-to-house canvassing? Is it the mailing of thousands upon thousands of highly colored, finely printed folders?

The answer is NO! It is not any one of these things. It is a systematic plan which may involve one, two or all of these things.

But, above all, it is a studied plan which is based on your financial standing and the requirements of your community. When business is booming, plans are often forgotten. Everyone seems to get business—some without perceivable effort. But when the boom is over, the condition is different.

Who Is at Fault

Men! the furnace industry is the most backward of all industries. Why? Is the manufacturer at fault? I answer YES, when it comes to taking the dealer into consideration. Too many manufacturers are careless in selecting their outlets. They have let too many alley rats act as contact with Mr. and Mrs. Public.

Is the dealer at fault? And, again I answer YES! Why? Because as a whole, the dealer refuses to bring himself to the standard of a provider of health, comfort and convenience.

Are the merchandising men at fault, and the answer is still YES! They have overlooked one important item. That you must be sold on the very thing which is the vitality and the life of your business. They have been too busy telling you of the weight of their units—of the price and extended terms and have

not spent enough time in telling you that no matter what the weight, the cost, the terms, if you do not sell the consumer, then there is no business. They took it for granted that YOU, not they, should ask for these essential items of business.

Here's a simple outline of what you should do.

Now:

1. Clean up your places of business—by "clean up" I mean use the old reliable soap and water. In cleaning up, I mean every part of your establishment—outside, inside walls, floors, windows.

2. Arrange your windows to attract, to interest, to draw the passer-by into your establishment. Almost any manufacturer in the industry will assist you in this. But, whether you ask his assistance or not, do not clutter that valuable asset, your windows, with loads of elbows, sheets of metal and fittings and what not. Make them neat.

3. Arrange the store interior so that a prospect knows he or she is in a place of business and not lost in a forest of furnace and gutter fittings. An ideal arrangement, when the space permits, is to divide

Merchandising means selling according to a program. In this program you: Display your services or your products; Advertise in newspapers, on billboards, by handbills, by direct mail literature, over the radio, over the telephone; Sell personally, through canvassers, through salesmen, in your store. When you combine these three activities in a program, and follow the program, you are merchandising

the place into three parts:

1. An office.
2. A show room.
3. The shop.

Another is to combine the show room and office. The requirements for the show room are the furnace or furnaces, a small desk or table, chairs, a few pictures, a sales portfolio, a register panel and an accessory or two, and a rug or linoleum on the floor. For the office, I need not make any recommendations. The shop and stockroom, of course, must be neat, and as for tools, etc., you know more about that than I do.

Use Advertising

4. *Advertising*: At this point, you must be guided by the amount of money to be invested. Let's list the types:

Newspaper, Direct Mail, Movie, Billboard or Outdoor, Radio, Handbills, Fairs and Shows, Directories.

I believe it is safe to eliminate radio without further thought, for taken in its entirety, the dealers in this industry can't stand the investment required for this type of advertising.

Directories, meaning the phone book, architects' catalog, etc., can be recommended. However, if you do decide on such form, I believe that whether the ad be one inch or one page, real thought should be given to its makeup. Why wouldn't it be worth while to tell the manufacturer you represent what you want to tell the readers of the directory and have him in turn have his advertising department or agency make you up an ad or two which will work for you? In this way, your advertising expenditure can be made to pay a profit.

Newspaper Advertising—Here's an important item in the advertising budget. Many men of this industry say it does not pay—I say it does when properly applied. Nearly every manufacturer in this field is in a position to supply in plate or mat form ads for the dealer's use. Some go so far as to offer to pay a share of such advertising. In some

(Continued on page 40)

ESTIMATING VS GUESSTIMATING

(Part II)

By S. T. MAYTER

SOME contractors think that the proper time to request quotations from the equipment manufacturers is just as soon as the plans are received, so that by the time the "take-off" is completed, these quotations will be on hand for the assembled bid. However, as the estimator becomes more experienced, he will learn that it is well to hold off on his request for quotations, for various strategic reasons.

If you are the first contractor to secure plans, you will very likely be mobbed by equipment salesmen, who find it more convenient to do

their work in your office than in that of the architect. It may be that you possess certain advantages for doing the job that will cause your competitors to redouble their efforts to underbid you, if they learn that you are figuring the work.

Assembling the Bid

Then the architect may call for certain revisions on the work, between the time he issues the plans and the date for submitting bids. Many costly mistakes have been made by having two or three quotations on the same job in the job folder and using the wrong one in

assembling the bid. If you have only one quotation, based on the architect's latest revised requirements, this element of error is removed.

With these equipment quotations at hand, we are now ready to assemble the bid, listing the various items at cost on the Ventilation Estimate form. This form was developed and has been used for both simple and complex installations. Every item should be carefully checked with the specifications. Those items not required on the job should have a line drawn through the cost column, to show

VENTILATION ESTIMATE

SHEET No. 1

Job _____ Date Figured _____
 Location _____ Architect _____
 Owner _____ Engineer _____
 Address _____ General Contractor _____
 Amount of Bid _____ Estimator _____

	Cost
1. Fans	
2. Motors	
3. Engines	
4. Controllers	
5. Heater Coils	
6. Vents	
7. Aero Ein	
8. Unit Heaters	
9. Air Washers	
10. Air Filters	
11. Ozone Machine	
12. Belts	
13. Chain Drives	
14. Belt Guards	
15. Temperature Control	
16. Bypass Dampers	
17. Louvre Dampers Manual	
18. Thermometers	
19. Registers	
20. Register Faces	
21. Borders	
22. Grilles	
23. Wire Screens	
24. Ventilators	
25. Mufflers	
26. Sleeves and Setting Mufflers	
27. Stationary Louvres	
28. Wood Bases	
29. Floor Dampener	
30. Canvas Connections	
31. Lead Joints	
32. Total Sheet No 1	

Page 1 of the ventilation estimate sheet lists all the equipment ordinarily used. Space is provided for a cost entry. When the sheet is filled in all equipment should be accounted for.

Carried Forward	Cost
33. Erection of Fans	
34. Erection of Motors	
35. Erection of Engines	
36. Erection of Vento	
37. Erection of Aero Fin	
38. Erection of Air Washers	
39. Erection of Air Filters	
40. Erection of Mixing Dampers	
41. Erection of Bypass Dampers	
42. Wiring for Motor	
43. Plumbing—Air Washer	
44. Piping—Air Filter	
45. Concrete Foundation	
46. Steel Grillage	
47. Painting 1 Coat Work	
48. Painting 2 Coat Work	
49. Painting 3 Coat Work	
50. Painting Apparatus	
51. Covering Magnesia	
52. Covering Air Cell	
53. Covering Cork	
54. Covering Linings	
55. Hoisting	
56. Freight on Equipment	
57. Cartage	
58. Ventilation Permit	
59. Railroad Fare	
60. Board & Expense	
61. Commissions	
62.	
63.	
64.	
65.	
66.	
67.	
68.	
69.	
70.	
71.	
72. Total Sheet No. 2	

Page 2 is for special labor operations performed in connection with placing equipment. Some of these items, of course, will be subcontracted out but their costs should be listed nevertheless.

SHEET No. 3	
Carried Forward	Cost
23. No. 26 Galv. Iron Ducts	
24. No. 24 Galv. Iron Ducts	
25. No. 22 Galv. Iron Ducts	
26. No. 20 Galv. Iron Ducts	
27. No. 18 Galv. Iron Ducts	
28. No. 16 Galv. Iron Ducts	
29. No. 14 Galv. Iron Ducts	
30. No. 12 Galv. Iron Ducts	
31. No. 10 Galv. Iron Ducts	
32. No. 16 Black Iron Ducts	
33. No. 14 Black Iron Ducts	
34. No. 12 Black Iron Ducts	
35. No. 10 Black Iron Ducts	
36. Galvanized Angles	
37. Black Angles	
38. Range Hood	
39. Fusible Link Dampers	
40. 15 in. Branches	
41. 20 in. Branches	
42. 24 in. Branches	
43. 30 in. Branches	
44. 40 in. Branches	
45. 50 in. Branches	
46. Dampers	
47. Diffusers	
48. Radiator Shields	
49. Recess Linings	
50. Copper Work	
51. Breeching	
52. Access Doors	
53. Duct Sleeves	
54. Lead Work	
55.	
56.	
57.	
58.	
59.	
60.	
61.	
62.	
63. Total Sheet No. 3	

On sheet 3 all metal fabrication from the duct takeoff sheet is recapitulated. There are, also, itemized spaces for all the items requiring special fabrication, special metals, or sundry parts and accessories

SHEET No. 4	
Summary	
113. COST—Total of Sheets No. 1, 2 and 3	
114. Drawings & Test	
115. Liability Insurance	
116. Overhead	
117. Profit	
118. Association Dues	
119. Survey Fee	
120. Plan Fee	
121. Surety Bond	
122. Pro Rata Expense	
123. BID	
124. Revised Bid	

Bid Given To _____

REMARKS—

On sheet 4 all costs from sheets 1, 2, 3 are brought back. To these are then added all items of overhead, insurance, fees, etc. There is also space for special items. When this sheet is totaled, all job costs are ready for the bid.

that they have *not* been omitted through carelessness. Such items as are required that are not listed on the form can be inserted in the blank columns, and priced accordingly.

The final items on sheet number four are determined by the policy of the firm submitting the bid.

It is not our purpose to discuss the proper percentage to be figured as overhead. This subject will always provide lively discussion among contractors, whenever it is brought up.

We wish to emphasize the importance of definitely stating the amount of the surety bond you have figured, and also the amount you have included as your share of the pro-rata expense of the job.

Some architects and general contractors have no mercy on the subcontractors, frequently levying excessive charges on these items, when the sub-contractor neglected to state the amount he had included in his bid to cover them. These items have

frequently cost the ventilating contractor a large slice of his profit, and there was nothing he could do except pay them, and resolve to be more careful in the future.

With the bid totaled, ready for dictation, comes the time for the estimator to FORGET something. This thing he should forget, if he values his future standing with the architect, is to tack on to the bottom of his bid an unsolicited alternate, offering to reduce the bid if he is permitted to substitute something other than the architect specified.

Don't Substitute

This annoying practice on the part of contractors frequently places the architect in an embarrassing position before his client, to whom he submits the bids. The client or owner naturally questions the judgment of the architect in specifying a higher priced item. There is, perhaps, nothing a contractor does that an architect resents more than the habit of sub-

mitting unauthorized alternates. If you have an idea that will reduce the cost of the job, submit it to the architect informally beforehand, and find out whether it will be favorably received.

Most architects specify the day and hour for receiving bids, when giving out plans. There is no particular advantage for a contractor in handing in his bid several days previous to this date. In fact there is great danger that handing in your bid too soon is a positive detriment.

In spite of the care exercised in most architects' offices to prevent information concerning bids leaking out, such leaks have been known to occur. Your bid may lie, opened upon a desk, for only a few minutes, but may, nevertheless, reveal essential information to some one who can make use of it. Sudden revisions after you have submitted the bid may cause confusion in the architect's office. Perhaps they may use your original bid in place of the

(Continued on page 45)



Attic Supply and Trench Return Used in One-Story Observatory

IN 1930, the Detroit office of the Hess Warming and Ventilating Company of Chicago installed a forced air heating system in the Cranbrook Observatory. This installation contained such unusual features and problems that the system has been carefully watched since operation began to see if the design met the conditions imposed.

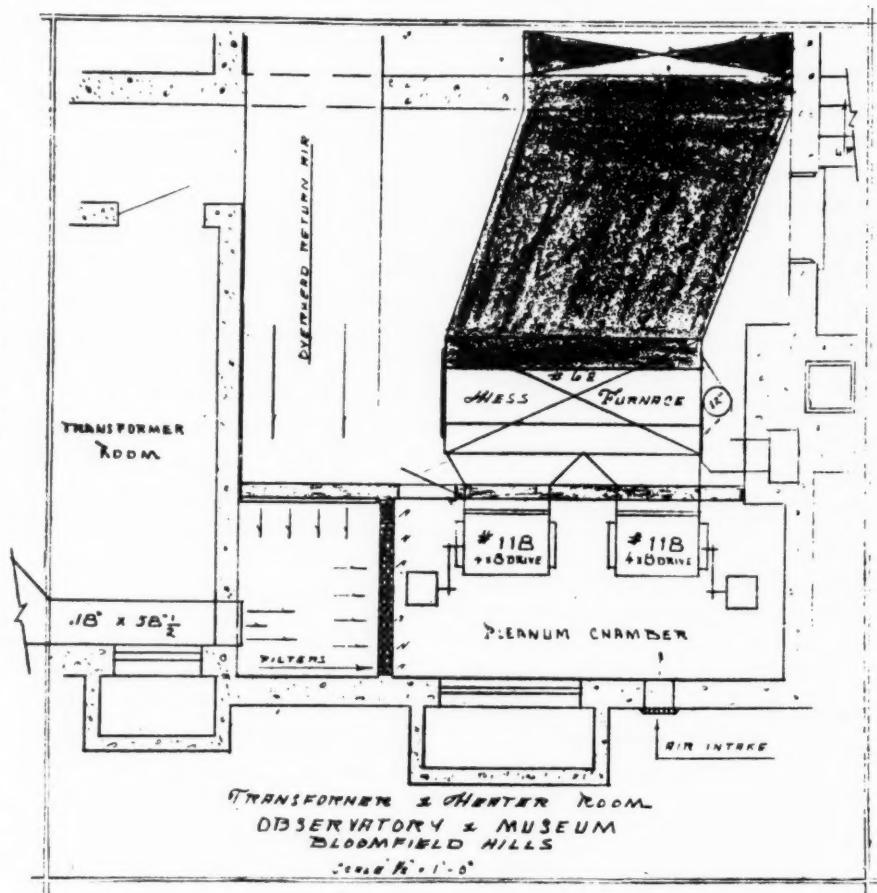
Results from two winters of operation show that the system meets every need of the occupants and that forced air is entirely practical for installations of this type. From this installation some interesting conclusions may be drawn.

The conditions imposed by the architectural design of the building were so unusual that both architect and the school authorities had to be convinced that a forced warm air system was practical. In outline, the building is a hollow square, with four sides around an open court. The building is one story high with a low attic and no basement excavation under most of the building.

In order to supply large volumes of air to the rooms and bring the cooled air back to the heater, attic supply ducts and trenched returns were necessary. It was this use of

an unheated attic and cold trenches, coupled with large exposed wall

areas which necessitated careful designing by the contractor.



Return air is passed through a filter bank and into the fan room, which is completely walled off from the furnace. One large riser off the furnace is split into two mains at the furnace room ceiling.

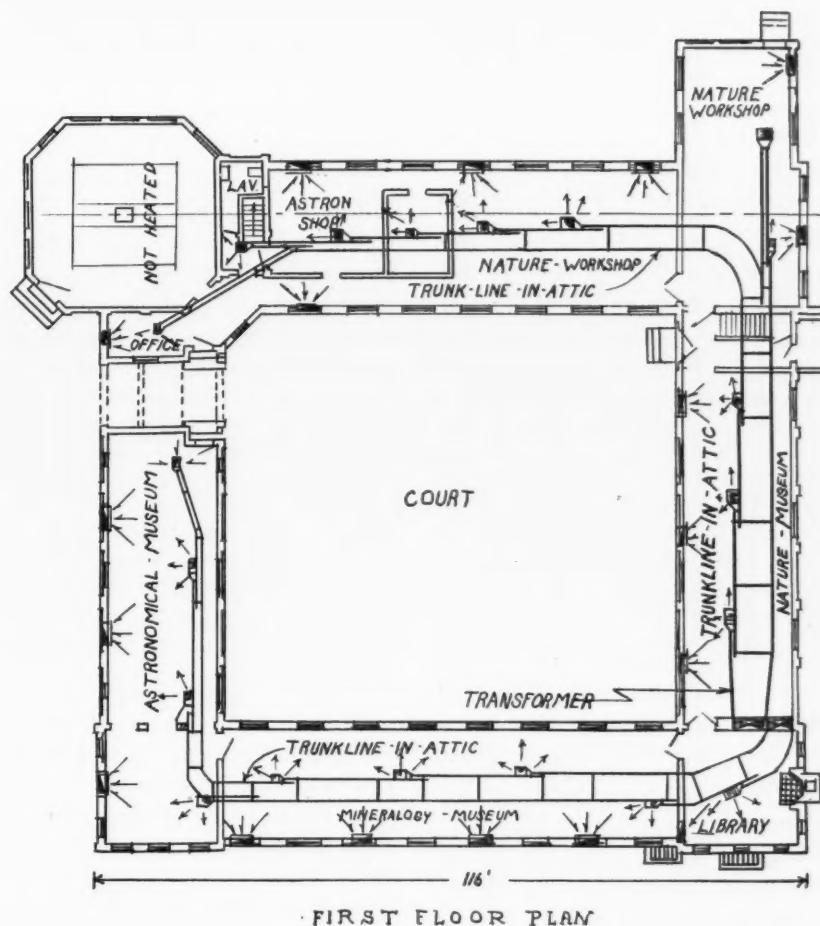
Now that the system has proved its practicability, the design seems logical enough, but at the time the contract was up for letting these unusual factors caused some concern.

In the area under the building one room for the heater and a small toilet room are the only basement excavations. The large Hess heater is so placed that one large supply main is taken off the bonnet and split at the library floor level into two rectangular risers.

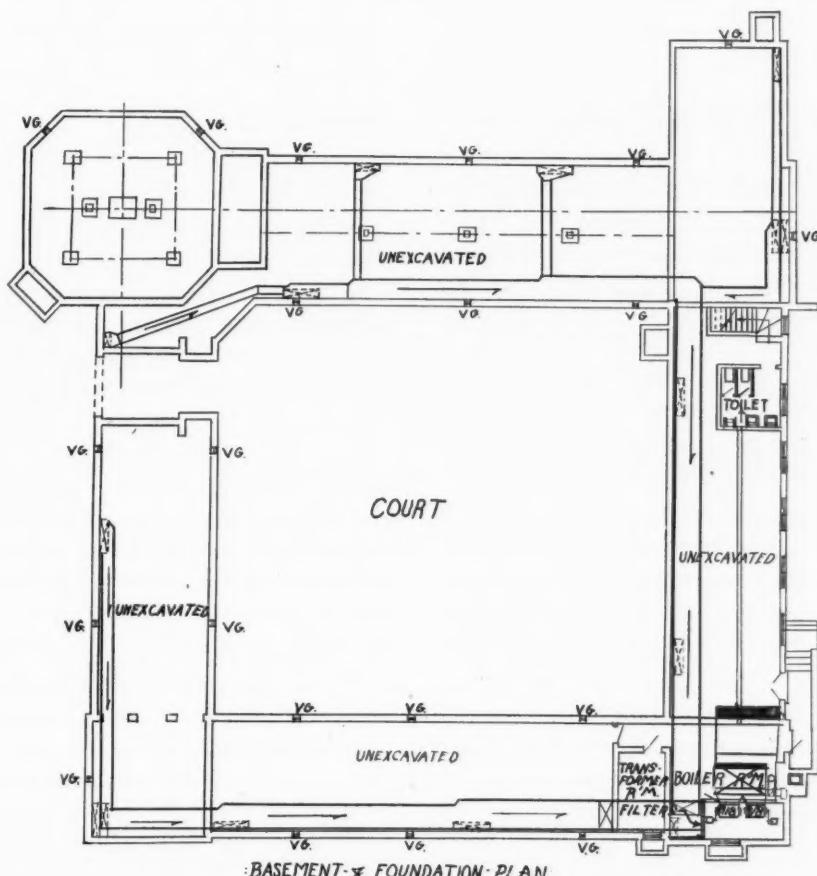
Supply System

At the attic floor level these two risers feed into two trunks which go in opposite directions. Each of these mains traverses two sides of the building, with a single end branch from the largest main supplying air to one room at the end of the side supplied by the smallest main. This arrangement is shown in the piping plan.

The total heat loss for the building is 586,714 B.t.u. The heater has a capacity of 750,000 B.t.u.'s at the



The warm air mains are carried into the attic, then along the attic floor to discharge through ceiling registers located approximately in the center of the rooms. This plan shows the piping system



Returns are under the first floor and through unexcavated areas. The return ducts are not insulated and are progressively enlarged from branch to branch according to friction per running foot of duct

grilles or more than enough reserve to meet unusually severe conditions. The system is designed for a temperature rise of -10 degrees to 70 degrees.

Anything but a forced air system was, of course, out of the question. To maintain air flow into the distant rooms, two blowers with a capacity of 6,000 c.f.m. were used. Each of these blowers is powered with a 1 1/2-h.p. motor connected by a rope drive and anchored through a sliding bases. The blowers turn at 650 r.p.m.

Branch Supply

The blowers are controlled by an automatic furnace switch installed in the bonnet and set to maintain the desired register temperatures.

Supply to the various rooms is through ceiling registers fed

through short branches from the attic main. The main is so located that the registers come approximately in the center of each room ceiling. The main is reduced progressively according to friction loss as each branch is reached. Duct work in the mains is of 24 and 26-gauge galvanized iron and is not painted in the attic. Each branch has a quadrant damper for control and to aid in balancing the system after operation began. Few changes have been made in the original settings in spite of wide differences in weather this past winter and the winter before.

As stated, the return system is mostly through unexcavated areas. Because cold air is advantageous in return, even though too cold air increases the load on the fans, the mains through the trenches were not insulated. This, of course, increases fuel cost by increasing the temperature range to be heated in the furnace, but results during two winters of heating show almost no excessive fuel cost.

The two return mains run simi-

larly to the two supply mains, excepting that the returns in one system are kept close to outside walls so the grille drops are vertical and short. Returns from the rooms are through floor grilles located at outside walls, excepting in one of the returns where inside or court walls are used. The reason for placing this return along inside walls was to avoid the toilet room in the basement.

Return System

Both returns are brought to one wall of the fan room. As shown in the heater room detail, this fan room is divided into two parts by a wall of filters. Air from the building is all brought into one end of the room, passes through the filter bank and enters the fan section of the room. This fan room also has an outside air intake which is operated manually. Excepting for the entrance door, this return air chamber is air tight for cleanliness.

The toilet in the basement is heated by an individual run without

any return. This shows in the basement piping plan.

Two conclusions may be drawn from the satisfactory operation of this system. First, supply and return through unheated areas is entirely practical providing the designer takes into consideration the heat loss from the supply. In this particular installation the heat loss from the two supply mains, crossing as they do along unheated attic area, is high, but by stepping up the velocity to six air changes per hour and providing plenty of heat by setting the fan control at a high temperature, this loss is overcome.

Secondly, this system demonstrates that even under unusual obstacles, forced air heating is economical and practical. In this installation satisfactory heat is supplied to rooms a long distance from the heater, a set up which ordinarily would be considered ideal for a steam plant but not warm air. We may say, then, that forced warm air adequately designed is flexible enough to meet the unusual problems.

What Is Merchandising?—(Continued from Page 35)

cases, such ads lack the consumer angle, but, in many cases, you can feel sure that these ads will do the work.

Then, for dealers who desire to use small space of their own, allow me to recommend a true study of the use of small space. Small space must be attractive to gain attention over the big boys next to it. It must be forceful, yet brief, because small space will not permit the use of many descriptive lines. Above all, it must be used consistently.

Movie slides in small towns will effectively tell your story while the prospect is in a pleasant mood. The small town theatres will make you a very attractive rental price for running these, and I will bet you a pretty penny the furnace manufacturer whose units you sell will supply three or four styles free—try and see!

Billboards can be passed up for the present as those to come under isolated cases. Outdoor advertising, however, is important. No job, whether it is cleaning, repair, replacing, or installing a new furnace should ever be done without an appropriate sign in the yard or on the building to tell neighbors of your ability—your trucks should be rolling signs. Every job you do should act as an entre to other jobs.

Fairs and Shows—Many advertising men question the desirability of exhibiting at such places, but I say to you—the smaller the town, the better the show. Whenever it's possible, get in them. But, before going there, get together with the various manufacturers with whom you are doing business and plan a real exhibit. Don't do a half-hearted job—dress up your display—have plenty of literature with your name,

address and 'phone number. Sell yourself and your product to everyone who stops to look.

Direct Mail—Before saying anything on this, however, let us remember that 100 *good* prospects for mailing are better than 1,000 *questionable* ones. In the case of mail, in most cases, it would be better to turn to your manufacturers for they can give you many suggestions that are valuable and they can supply direct mail material far better than any of you could dare to produce in the small quantities you would need.

These plans are merchandising, and to get business this year, you must decide where you are going and go by the most direct and most economical way. It's the planner, not the panner who will lead the Warm Air Heating and Sheet Metal Industry up and out of the shadows of the alley.

Illinois Talks Business—and How to Get It in 1932 Convention

QUESTIONS of business—how to get it, how to keep it, how to protect the interests of the sheet metal and furnace contractor, what can be done to stimulate construction, how local, state and national associations can help the contractor—these and problems of a similar nature dominated the Illinois State Convention held April 6 and 7 in Peoria.

And while attendance was off, somewhat, the intense interest in today's problems more than made up for the lack of larger attendance and sent members back home with renewed determination to see this condition through and be present at the end, still fighting.

President's Address

The keynote of this year's convention was sounded early the first morning in the address of Frank I. Eynatten, president. Not only did he raise many of the questions which dominated the following sessions but he clearly outlined the problems and some possible solutions and stimulated discussion which proved a feature of the entire meeting.

Among the many important points raised, Mr. Eynatten said:

"The lack of building construction is serious in its effect on present depressed conditions, as evidenced by a comparison of reports from various localities. Of all the remedies suggested to overcome the condition, I think steps looking towards the reform of our whole tax system are first in order that there might be some correlation between national and local tax."

"There are already manifestations that tax payers have reached the limit of their patience, for here and there we hear of tax payers meetings and of the inability of people to pay the taxes imposed upon them. This question of taxes is perhaps the most important domestic problem facing us today and

every effort should be made to reduce local, state and governmental expenditures to the lowest possible level.

"Already the prices of building materials of all classes have been greatly reduced and labor has, in a great many places, taken a voluntary reduction in wages averaging approximately 20 per cent. In cities where no reductions have gone into effect it will in another 30 days or on May 1 when the various present agreements expire.

"Another element of danger is the eager contractor who cuts his price in order to obtain what little work there is at present. Remember, every contract that is taken, every sale that is made at a profitless price, retards the return of prosperity. Profits are essen-

dise is good, that our costs of production are right, that the quality is the best and our business is built upon a solid foundation.

"Unfortunately, during the past year we did not appoint a legislative committee. I just observed last year that out of 29 bills pertaining to labor alone, 17 were passed in favor of labor. None of them was particularly vicious, but it just goes to show the activity at all times in the legislation. This year I am going to strongly recommend that a legislative committee be appointed and put all their efforts forth to meet with the forces.

"At the last meeting of the National Association we rearranged our Constitution and By-Laws, and membership is not now necessary in the National Association. You can become a member of the State without becoming a member of the National."

OFFICERS FOR 1932

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Vice-President

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Business Discussions

This keynote address was followed by a general discussion of business led by George Harms and the president. In the discussion, the Rochester, N. Y., program to stimulate small contract work was outlined and discussed. Platte Overton, engineering editor of *AMERICAN ARTISAN*, related his experiences in getting contractors to go out and sell air conditioning to owners of steam and hot water heated homes, stating that this class of home owner constituted an excellent field for sales promotion work.

B. M. Dennis of Decatur followed this by describing the work promotion campaign which Decatur business men were preparing to launch on April 18. The campaign will require a complete house to house canvass of every block in the city. Each business man is to be assigned a certain number of blocks according to the number of employees he can put in the field. The campaign aims at a total amount of new work of not less than \$200,000. Every possible kind of work, from

tial to the continuance of our economic system; without them the machinery of trade runs down and results in business stagnation such as we are now experiencing.

"A fair return to the craftsman for his work; to the engineer for his skill; to the contractor for his executive ability, and to the manufacturer for his product is essential to business health. Ask a reasonable price with a correct profit for your commodity or your services and then stick to your prices. We should strive to make our business a success and we can accomplish this if knowing that our merchan-

new store building to raking the yard will be solicited.

Joe Walters, past president from Ottawa, rose and said that his town was getting ready to launch a similar campaign and that he believed the idea should be promoted by sheet metal contractors in every community.

Association Memberships

One of the main points of discussion of the entire convention centered around the matter of association memberships, how to get new members, how the new national ruling is going to effect the local and state organizations, also the individual. This situation, as George Harms pointed out, "is not so much how are we going to pay dues and to whom, but how are we going to pay our personal and business expenses. Many contractors, he said, are dropping out of all associations and the only way in which membership rolls can be maintained is for every member to get another member and keep him in the organizations."

According to Mr. Harms, association membership has now been revised as follows:

1. Wherever possible, national members shall organize themselves into local associations and payment of dues shall be made direct to the national and not through the state as heretofore.

2. Any individual or firm operating in an area where there is no local may become a member of the national upon payment of the proper dues.

3. Where state associations exist, these state associations may hold membership in the national and

have representation at all national conventions.

4. Annual dues to the national shall be based on the number of journeymen employed by the firm requesting national membership. These rates are—shops employing less than 3 men, \$5.00 a year; shops employing 4 to 9 men, \$15.00 a year; shops employing 10 men or more \$25.00 a year. Dues become payable on the first of every year.

5. Members have the right to place their shop in either one of the three classifications listed above.

The discussion of these changes led to the adoption of a resolution declaring that the Illinois association favored a flat dues of \$50.00 for state association membership in the national. Also, that any individual might join the national direct or through a local association. Also, that the Illinois association favored the direct payment of dues to the national and not through a local or state association.

Considerable discussion was held on the question—"How can associations stimulate attendance at conventions?" Some members favored exhibits similar to those staged by the hardware trade. Other members stated, however, that such exhibits were falling off in favor. Mr. Dennis told of splendid meetings held by the local Decatur association and recommended holding meetings based on one topic for discussion such as air conditioning, getting business, etc.

Wage Scales

Discussion on the floor also indicated that wage scales are dropping all over Illinois and that as a general rule this decrease is from 15 to 25 per cent.



Merchandising Air Conditioning—Platte Overton

"My contact with architects, solicited in a program of calls to forward the idea of air conditioning systems in homes, has left me somewhat discouraged. I trust it is my lack of convincing or sales ability and not a lack of

foresight on the part of the architect.

"Can it be possible that in the architect's opinion there are no benefits in air conditioning, or that it is only the dream of some theoretical engineer? That the former is impossible and the

latter improbable is borne out by the fact that a resultant gleam of intelligence is registered when, or if, you should bring to him your troubles regarding a new warehouse in which you wish to store hides, tobacco, paper

One of the important resolutions adopted was the incorporation of the code of jurisdiction first prepared by members of the Ft. Wayne, Indiana, association and later adopted by the Indiana association. A full copy of this code was published in AMERICAN ARTISAN of February 29, 1932.

Wednesday Afternoon

The first speaker on the afternoon program was Mat. Friedman, of Chicago, who spoke on "Merchandising." The principal parts of address published on this page.

Following Mr. Friedman, D. C. Strickland, of American Rolling Mill Company, discussed "Selling." His talk appears on the next page.

Thursday Morning

The first speaker on the morning program was Platte Overton, engineering editor of AMERICAN ARTISAN, who discussed selling air conditioning. The highlights of this address published on the next page.

Following Mr. Overton, Joseph G. Dingle, public accountant of Ottawa, and writer of many interesting cost accounting articles in AMERICAN ARTISAN, analyzed cost methods from reports given him by typical sheet metal and furnace shops. This complete address will be published in the next issue.

or soy beans.

"Let us say that it is soy beans. He will immediately instruct his mechanical engineer to investigate soy beans. What temperature, humidity, air motion and cleanliness do they require? He will know to a bean just how many may be stored in a given space and in what manner they are handled. The most private item in the soy bean's life will be exposed and considered.

"Now let us decide that we will build a \$25,000 house and again bring our problem to this average architect. In this house we may install the collections of a life time—fine furniture, rugs, drapes, and in this home will also be our dearest possessions.

"Does the architect now go into a huddle with his mechanical engineer, and carefully study the requirements of the human body? Does he consider the humidity, air motion, temperature regulation, cooling, cleanliness? He does not.

"He sticks a radiator in a corner, or possibly under a window. Is it possi-

ble that humans are not as important as soy beans?

"This same architect will point with obvious pride to the fact that this great boon of mankind—the cast iron radiator—has now progressed to the magnificent state where it may be made of copper or steel and concealed in the wall where it requires the art of a 'Houdini' to clean, and the humidity derived from said bashful radiator may be measured with a microbe scale.

"When practical cooling is devised, it will probably require an indirect system of ducts to convey this cooled air. Just what these radiators exposed or concealed will then do is left to conjecture. Some states and cities have air conditioning codes backed by laws requiring and demanding atmospheric conditions beneficial to health and comfort in theatres, schools, restaurants, and public buildings. Where the public pays to occupy such space as in theatres, restaurants, etc., such laws are hardly necessary. The public in general condemns unconditioned houses

by lack of patronage. They are air conditioned because it pays.

"But how about the modern home of from 9 to 18 rooms. Hundreds of such handsome houses are even now being constructed in the new and better sections of American cities. I have inspected scores of fine dwellings in suburbs of America's leading cities. These places sell complete from \$20,000 to \$50,000. Most of them had direct or concealed radiation. By 1940 they will be as out of date as old Fort Dearborn. True, modern air conditioning systems may be installed, but at three times the cost of the installation if made when the place was built.

"The fact remains that the modern air conditioning system for homes with its furnaces, air washer, filters, humidifiers, and fans is being overlooked or passed up by the architect designing the modern up-to-date and better home.

"The big fact we must remember is that the heating plant which merely heats, no longer is adequate.



What Is Merchandising?—D. C. Strickland

"In our business operations we all do three things—we buy something; we do something with what we have bought, and we sell it.

"Whatever your education, whatever your tool, whatever you have in the way of investment, borrowed money, or what you have you trade that for dollars at the time you make your sale.

"Channels of Distribution are much discussed. However, such channels fall in the following classifications—

1. Source of supply.
2. Material salesman.
3. Distributor or jobber.
4. Distributor or jobber salesman.
5. Sheet metal contractor.
6. General public (who pays the bill for all).

"Now, whatever can be done to eliminate waste, duplication or time is good merchandising. No matter how good you are as an artisan, unless you sell it, how good are you? If you have no ability to sell, one or two things will happen. 1. Either you will work for somebody else who can sell; or 2. You will be by-passed entirely and you will find yourself stranded.

"We also hear much about the psychology of selling. Briefly stated, psy-

chology of selling deals with ways to sell goods. These ways are—

1. Advertising.
2. Good display.
3. Personal salesmanship.

"1. Advertising—making people want what you have and telling them where they can get it.

"2. Goods display: It takes goods to sell goods. You are putting to work that fundamental force of selling. You cannot expect one to do the other. You may spend thousands of dollars getting people in your store, but if you have nothing for them to see when they get there, you might as well save the money you spent for advertising, and vice-versa.

"3. Personal salesmanship: I recommend this point strongest of all. I wonder if you realize that after all, people sell goods to people? You men as sheet metal contractors selling the people have a tremendous problem. The other two forces, unless tied onto this third force, will be of no assistance.

"We must not overlook the question of personal salesmanship—get these eight points:

1. List the advantages of what you have to sell.
2. Put them in proper order. Put down those that will arouse interest

first, and those that will close the sale at the end. When I go to see a customer, I at least have an idea of the events.

"3. Get a proper introduction. Look at it from the customer's standpoint—arouse interest and show the customer you know what his problem is.

"4. Talk up to the merchandise and not down to the price. Price does not mean everything, but it does mean a lot. Remember, first of all must come the need of the equipment.

"5. Practice. Get ready for your customer. Go over your story a time or two before you make your first call.

"6. Approach the customer and do the best you can.

"7. What happened when I talked to Mrs. Smith? What argument pleased her or displeased her? Analyze your sales talk; each and everyone of them.

"8. If not successful, go over your entire sales talk and look at it from the customer's standpoint and—try again!

"By all means remember to create desire for buying instead of making 'forced sales.' Today we are doing business for less. We have all had a hard struggle, but once we get through the door this time we will go through with more brains."



Air Changes for Industrial Ventilation

THE number of air changes suitable for industrial ventilation varies with the industry and every kind of industrial plant presents its own problems. Even within one plant, or within the same room of one plant, there may be several different ventilation problems, each of which must be handled on its own merits.

A great many industrial plants are segregating their ventilation problems. By this I mean that if within a certain room there are several different types of equipment throwing off heat, steam, smoke, gases, etc., as the case may be, each process or equipment is supplied with whatever hoods, baffles, exhausting devices, etc., are necessary. This is not the universal practice, but it is a very good practice, and is being adopted more and more widely.

Perhaps the best bases for calculating the number of air changes necessary for any other particular class of work are the tables published by most ventilator manufacturers, recommending the number of air changes necessary for specified types of buildings which they list. These tables are necessarily general and not specific. They must be used as a basis for estimate only, and a specific application must be made by the sheet metal contractor, who is in a position to take into consideration the actual conditions obtaining.

He will be wise if in addition to using the manufacturer's table, he also uses the manufacturer's experience. He will find any of the best known ventilator manufacturers ready and willing to help him solve

By PAUL R. JORDAN

any ventilating problem satisfactorily. There are many elements entering into the solution of a ventilating problem besides the size and number of exhausting devices necessary, and the ventilator manufacturer, covering as he does a wide territory, is best able to furnish from his experience the necessary information.

It may seem somewhat unfair to depend so strongly on the manufacturer for the necessary elements of success in handling ventilating problems, but he is the natural one to look to, and as a matter of fact the logical one. The furnace manufacturer is doing much to educate the public to the value of warm air heating and to educate the installer

in correct installation methods. The oil manufacturer is educating industry in the proper use and value of lubricants; the accounting machine manufacturer is educating the public in better bookkeeping methods; so it is natural that the ventilator manufacturer should stimulate public interest in ventilating, and should also give the installer whatever information is necessary to insure a successful system.

As to the best ventilator type to use;—that depends on just where it is to be used. There are certain places where a stationary ventilator will give very satisfactory results; but where positive ventilator action is necessary, a rotary ventilator is better. Of course, the fan ventilator is more powerful than either.

The most important element in building up a reputation for knowing ventilation and for installing good ventilating systems, is satisfactory results. No contractor has ever built up a reputation or a valuable business in ventilation because he did work cheaply. But many contractors have built up excellent reputations and have made money because they delivered satisfactory results, by being high priced. Every one has heard consumers remark, "He is high priced, but he does good work, so I am going to give him the business." Few of us have ever heard a consumer remark, "He does rotten work but he does it cheap, so I am going to give him the business." It pays to use the best, if a contractor is intending to really build a reputation for ventilation; and to capitalize on it.

My classification of ventilator types may give the impression that

AMERICAN ARTISAN

Chicago, Ill.

Gentlemen:

I am the owner of a small ventilating and sheet metal shop. Frequently I have to install ventilators on laundries, creameries, dry cleaning establishments, etc. I would like to find out how to figure the proper air changes for work of this kind and if possible find out the best ventilator to use. I generally buy my ventilators and would like to use the best.

Thanking you for this information, I remain,

Yours very truly,
(Signed) A Reader

fan ventilators should be used on every job, but that is not true. While the fan ventilator is unquestionably the best exhausting device obtainable for certain classes of work, on other classes of work gravity ventilators, used in correct sizes and quantities and on a proper layout, will give just as satisfactory results.

The choice between the fan ventilator and a gravity ventilator often lies in the psychology of the consumer. Some plant owners like the visual proof of operation furnished by the fan. Others, however, are repelled by the thought of a never

ending outlay for current and services. Sometimes this repulsion is based on good, sound, common sense; other times it is merely a psychological trait of the individual.

There is one thing that the sheet metal contractor should constantly bear in mind because it affects his ability to sell the job, and that fact is, *that where a fan is needed a fan ventilator is the best type of fan that can be used*. Another fact that may be mentioned is, that, figured on the basis of proper capacities, there is not a great deal of difference in the initial cost of fans and of gravity ventilators. Sometimes

one will cost more and sometimes the other.

There is at present a wonderful opportunity presented to the sheet metal contractor to stress ventilation installations. Any sheet metal contractor who is a good mechanic can, if he will, build up a valuable reputation along this line. In addition the experience, products and facilities of the ventilator manufacturers are always available. By all means, he must be willing to insist on good installations of sufficient capacity to assure satisfactory results. He cannot build success in ventilation on a price basis.

ESTIMATING VERSUS GUESSTIMATING

(Continued from page 37)

revised one, classing you as a careless and slip-shod contractor for not following their instructions.

Submit your bid, if possible, not over a half hour before the time set for closing and you will save yourself a lot of grief, after having gone through the expensive proceeding of figuring the job.

We will leave the ambitious estimator at this point, hoping he gets the job. If he has followed the method outlined, has accurate information as to his cost, has been honest with himself and with the architect, he has very likely lost the job to some less intelligent competition. He then looks around for some short cuts in estimating, so that he can figure more jobs. He reasons that the more he figures, the more work he is likely to get.

Most short cuts in estimating are merely short cuts to bankruptcy. There is no substitute for laboriously digging out the facts of a job from the plans and specifications, and it is in the monotonous repetition of digging and tabulating these facts that most errors in estimating occur. Anything that will reduce the monotony of figuring similar items over and over again, without sacrificing accuracy, is to be desired.

The next article will outline a method that has taken a great deal of the sting out of estimating.

HIP MOLDING PATTERN

(Continued from page 19)

These intersections are shown by the cross marks on the curve. Now project these intersections over onto the view of section "O" and find where these projections intersect the corresponding lines perpendicular with the view whose curve is a, b, c, d, e, f, g & h. Through these intersections whose points are indicated by the crosses a smooth curve can now be drawn passing through these points and through the known points a and g. Next, determine the positions of the other three curves by the same method. Remember that the length of the base changes with each curve, and in the base in the two views will again have to be divided into an equal number of equal parts.

The pattern shown by the view section "O" is also divided into equal segments and each segment developed. This pattern becomes smaller at the bottom, thus making the development on the form of a taper. This development can also be changed by the method previously described so that the development will be in the form of long curved strips.

FILTERS IN GRAVITY SYSTEMS

(Continued from page 34)

market and a universal appeal.

In developing the boots for the filter sections, a number of designs were tried out. One of the earliest was the use of a filter cabinet disconnected from the house return system. The filter sections were arranged as detailed and operated satisfactorily.

The profitable possibilities of selling this new service are plainly indicated by one of Toledo's leading furnace installers who reports, "All a man needs to do to interest the housewife, who for centuries has been interested in the general subject—Dust—is to put a dirty filter under one arm and a clean one under the other, ring the bell, and ask, 'Would you like to filter all the dust and dirt from the air circulated by your furnace and at the same time clean all the air in your house several times a day, if the cost of the labor-saver is only approximately \$25.00 when completely installed'?"

He quotes, "We have given this system every possible test. We have tried it on all sorts of installations, and have not had a failure or complaint. We see in this idea sales possibilities so huge that there seems to be no end to the market."

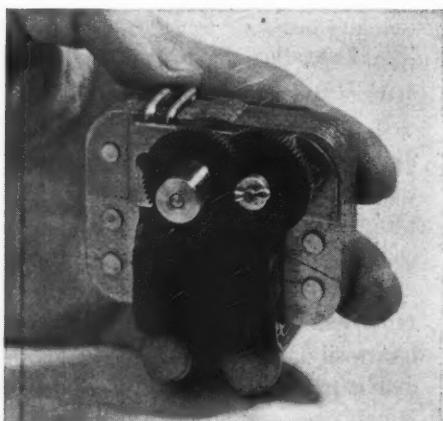


New PRODUCTS

New Geared-Head Motor

Barber-Colman Company, Rockford, Illinois, announces that the small shaded-pole induction motor which was recently put on the market by them is now available in a geared-head model. This consists of a standard motor to which has been added a spur gear reduction. The unit will deliver a maximum torque of two pound-inches at approximately 100 r.p.m. The input required is 37 watts or less, depending upon which of the several models of standard motor is specified.

The spur gear speed reduction mechanism is specially designed to provide



quiet operation. Two pinions and two gears are used, the pinions being of steel and the gears of Textolite. These gears are accurately cut to tolerances of .001 inch on runout and .002 inch on pitch diameter.

New 1932 Tornado Furnace Cleaner

The Breuer Electric Mfg. Co., Grand Rapids, Mich., announce their new Ball Bearing 1932 TORNADO Furnace Cleaner. The 1932 machine has not been changed in basic design although many improvements have been incorporated and many worthwhile, necessary attachments have been added as standard for greater efficiency in cleaning.

Aside from the sturdy, compact design of the TORNADO and the construction that combines power with light weight, the following features are claimed for the improved machine: Weight only 30 pounds; no heavy dirt or injurious foreign matter can pass

through the fan; ball bearing construction throughout—no oiling or maintenance required—G. E. Universal motor $\frac{1}{2}$ h.p., 10 gallon steel tank; power unit can be instantly removed from unit for blowing dirt from the air system without taking down pipes; increased power made possible by special fan design and power unit construction.

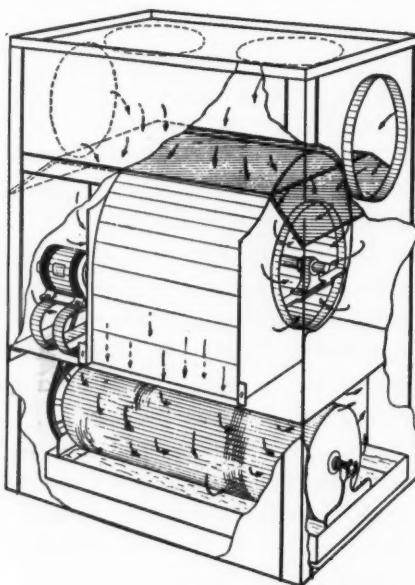
Literature may be secured from the company.

Improved Hess Conditioner

The Hess Warming and Ventilating Company, 1211 South Western Avenue, Chicago, announces an improved conditioning unit which may be attached to existing furnaces to provide circulated, filtered, washed and humidified air.

The conditioner is designed to be attached to the furnace by changing return air leads to empty into the top of the unit. Air from the house is drawn through an air filter before passing into the blower. Below the fan there is a wire mesh cylinder which revolves through a water pan. The meshes pick up a film of water through which the air is compelled to pass. The air breaks up this water film and in doing so picks up moisture for humidifying.

Some very attractive literature, suitable for distribution to the home owner, has been prepared. Copies of



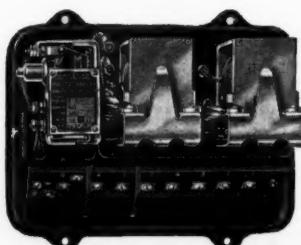
this literature may be secured from the company.

Protection Against Escape of Unburned Gas

One of the newest developments in the automatic control field is a device which provides instant and positive protection against the escape of unburned gas or oil in the event of flame



The Protectoglow



The Glo-Relay

or pilot failure. Although it may be used in place of the customary combustion or pilot safety device, its outstanding characteristic is its ability to handle installations where conventional controls are inadequate.

This new system, called the Protectoglow, has been developed by the Minneapolis - Honeywell Regulator Company. Entirely electric and without moving parts, it is not dependent upon temperature. The heart of the device is the Protectoglow tube, which acts as an electrical relay and is capable of operating at the command of an exceedingly minute electric current passed through the flame itself. Should the flame fail, the circuit through the flame is broken, instantly shutting off the gas or oil flow. In the absence of pilot flame, the Protectoglow will not allow the burner to start.

Another instrument, the Glo-Relay, is used in conjunction with the Protectoglow and serves to operate the valves or motor of the burner at the command of the thermostat, control switch, or Protectoglow. It is self-contained and is available for either constant or intermittent burners.

ASSOCIATION ACTIVITIES



Grand Rapids A. C. I. Hold Annual Meeting

The Grand Rapids Allied Construction Industries held their annual meeting at the Association of Commerce dining room on Wednesday evening, March 16th. Very near a hundred members turned out for the meeting and it proved to be an interesting and worthwhile session.

Following the dinner and some entertainment, President Martin Louwerse called the meeting to order and introduced three guests from Flint, Walter Gross, Arthur Brewer and Jim Hage. Clyde James, past president, was then introduced and he gave a review of the history and development of the Allied movement.

Manager Frank Ederle was next called upon and he gave a very comprehensive discussion of the present plan of operation. William Decker, Secretary of the Plumbing and Heating Contractors' Association, also gave a few remarks, which concluded the meeting.

National Warm Air Assn. Meeting

The National Warm Air Heating Association has prepared a program for the May 18 and 19 Spring meeting to be held in the Deshler-Wallick Hotel, Columbus, Ohio. The association says of the program:

Only subjects of practical and timely interest have been selected. The speakers the first morning are from our own industry. The afternoon of the same day will be devoted to the first report from the investigation in mechanical warm air heating and air conditioning in residences. Thursday the convention will hear from R. B. Leckie, Professor of Gas Engineering, Purdue University, on the "Use of Gaseous Fuels in Home Heating," and F. Paul Anderson, Dean of the College of Engineering, University of Kentucky, whose subject, under the title "Keeping Cool," will tell about cooling homes during the summer months. B. L. Schwartz, a well known and successful heating contractor of Pittsburgh, will contribute a paper on the "Opportunity for Successful Dealer Activities," and "Air Pollution and Its Relation to Commu-

nity Health" by H. C. Murphy, of Louisville, Kentucky, will furnish the latest information on that subject.

Thursday afternoon important reports will be made by the Code, Trade Relations, Public Information, Credit, Traffic, and other committees.

Wednesday evening will be occupied by a buffet supper and smoker with special and unique entertainment. This feature will be entirely different from the Association's traditional banquet.

Reduced railroad fares under the certificate plan will prevail. The Convention Committee asks that even if a return ticket is not going to be purchased, a certificate be secured on the going trip so that they may have the required minimum in order to obtain the one-half rate fare.

Grand Rapids Association Entertains the Ladies

President George VanderMolen of the Grand Rapids, Mich., Heating Association, came forth with a very novel idea just prior to the recent convention and the organization put on a dinner party on Monday evening, February 22nd. The unusual part of the affair was that it was for the wives and daughters of the members and the men were left at home to do their own cooking or in some manner shift for themselves.

It is reported that a splendid time was had and we are also informed that on May 16th the ladies will again hold a dinner meeting. Mrs. John Wierenga acted as chairman of the meeting and Mrs. F. E. Ederle was appointed to arrange the details of the next affair.

Committee of Ten Issues Bulletins

The Committee of Ten has released the first two of their series of bulletins—Educational Bulletin No. 1 and No. 2. No. 1, "Chimneys and How to Build Them," comprises about 20 mimeographed pages illustrated with charts and trouble tables and is written so that the layman may understand it. Although the information is simply presented, its preparation under the chairmanship of Homer R. Linn makes it authoritative. The standard chimney ordinance recommended by the Na-

tional Board of Underwriters and suggested contract specifications for chimney construction add considerable value to this bulletin. Single copies at 15 cents and others in lots at graduated prices can be obtained from the Committee of Ten, 307 N. Michigan Ave., Chicago, Ill.

Educational Bulletin No. 2, "Fireplace Construction" (10 cents per copy), covers the essentials of fireplace construction in a similar manner.

Ohio Auxiliary Officers for 1932

The Jobbers and Salesmen's Auxiliary to the Sheet Metal Contractors' Association of Ohio elected the following officers and directors at the recent annual convention of the Ohio contractors:

President

George G. Auer, Auer Register Company, Cleveland, O.

First Vice-President

J. T. Crossland, May-Fiebeger, Newark, O.

Second Vice-President

J. T. Hagan, J. M. & L. A. Osborn Company, Cleveland, O.

Secretary-Treasurer

Lee W. Gillespie, Ferdinand-Dieckmann Company, Cincinnati, O.

Sergeant at Arms

F. L. Hoersting, Jr., Cincinnati, O.

Directors

D. A. Hossler, Chairman, Cleveland, O.

A. K. Anderson, Toledo, O.

C. E. Waller, Nellie, O.

A. L. Bauer, Columbus, O.

R. A. Fraas, Columbus, O.

F. W. Beach, Warren, O.

Coming Conventions

National Association of Sheet Metal Distributors—May 11 and 12, Philadelphia, Pa. Annual meeting. Headquarters, Bellevue-Stratford Hotel. George A. Fernley, secretary-treasurer, 505 Arch Street, Philadelphia, Pa.

National Warm Air Heating Association—May 18 and 19, at Deshler-Wallick Hotel, Columbus, Ohio. Secretary, Allen W. Williams, 3440 A. I. U. Building, Columbus, Ohio.

News Items

Northern Blower Increases Staff

The Northern Blower Company, West 65th Street, south of Denison, Cleveland, Ohio, announces that due to the increasing demand for non-corrosive materials used in dust and fume recovery equipment the company has added to its staff Karl Gross, an authority in lead burning, lead coating and homogenous lead work.

Through this enlargement of the staff the company states that it now is in position to quote on any kind of lead work, burning or coating and all kinds of lining operations.

Sacramento Jobbers Merge

The Thomson-Diggs Co., wholesale hardware house with steel department at Sacramento, Cal., has purchased the Schaw-Batcher Co., its local competitor. Both are historic California houses dating back to pioneer times. The executive personnel of the Thomson-Diggs Co. includes C. F. Prentiss, president; F. F. Thomson, vice-president and general manager; J. W. Geeslin, secretary and treasurer; A. E. Goddard, sales manager.

Unusual Items in Chicago Mfg. Catalog

Many items not ordinarily listed in a catalog of sheet metal products are to be found in the dealers' net price book issued under date of March 1 of this year by the Chicago Metal Mfg. Co., 3724 South Rockwell Street, Chicago, Ill. This is a book of 68 pages and cover and lists practically all of the usual supplies for sheet metal shops,

such as conductor pipe, eaves trough and fittings, sheets, furnace pipe and fittings, registers, roofing cement, roof ventilators, skylights, metal ceilings and the like. Among the unusual items are spun half balls, garbage cans, louvers, blow pipe elbows, angle flanges, blast gates, ball joints, hanger rings, welded sheet metal pipe, lock seam pipe, loading grain spouts, stock tanks, etc.

A copy of this booklet is available on request.

National Steel Officers Appointed

At the recent meeting of the National Steel Corp., the following men were re-elected directors: Ernest T. Weir, Frank W. Blair, Maurice Falk, George R. Fink, Howard M. Hanna, George M. Humphrey, Edmund W. Mudge, Carl N. Osborne, Charles M. Thorp, John C. Eilliams.

All incumbent officers were re-elected at the first meeting of the board.

Edwards Purchases John Van Range Co.

The Edwards Mfg. Co., Cincinnati, Ohio, purchased the John Van Range Co. of that city at a receiver's sale in the United States District Court on March 31. The latter company is engaged in the manufacture of equipment for hotels and hospitals and for the time being, according to Howard Edwards, president of the Edwards Mfg. Co., will be operated as a separate unit.

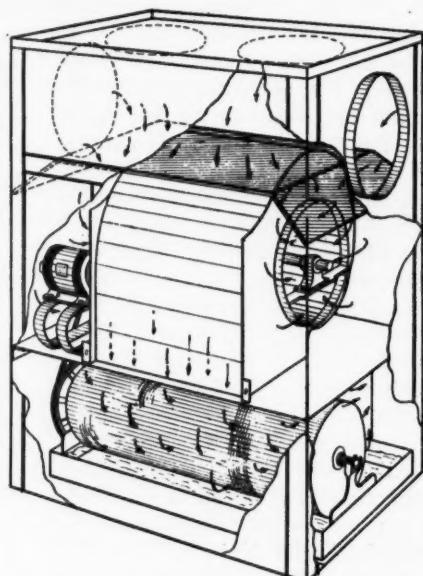
Move Osborn Detroit Office

The J. M. & L. A. Osborn Co., Detroit office and warehouse was moved Monday, April 18, to 690 Amsterdam Ave. The phone number is Trinity 2-2330.

The HESS AIR CONDITIONER For Any Furnace, New or Old



Filters, washes, humidifies and circulates the Air for Year 'Round Comfort



WITH this new, modern air conditioning unit a remarkable opportunity with unlimited sales possibilities is opened to the wide awake, aggressive furnace dealer and heating contractor.

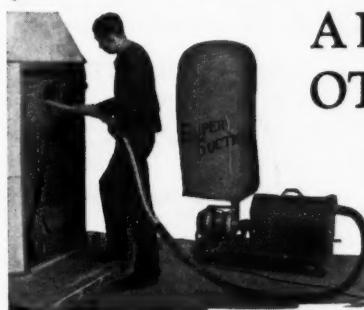
Every furnace user is a prospect for the Hess Air Conditioner to modernize the home, increase comfort and improve furnace efficiency. The Conditioner is not limited to winter use. Summer operation will provide a cooling circulation of pure filtered air thru the furnace piping system, and with summer approaching, now is the time for you to introduce the Hess Air Conditioner.

The Conditioner is finished in a beautiful green enamel and makes a job you can be proud of. It is priced within reach of the average home owner and a liberal dealer's discount allows you a nice profit.

Write today for folder and prices

HESS WARMING & VENTILATING CO.
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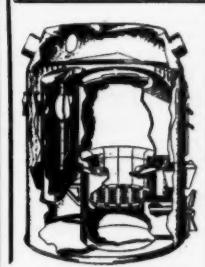
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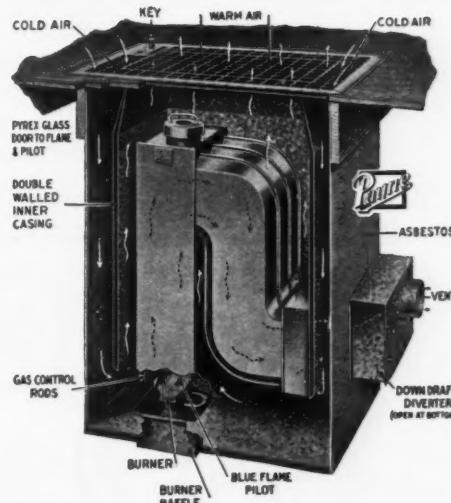
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Hess Warming & Vent. Co., Chicago, Ill.

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Henry Furnace & Fdy. Co., Cleveland, Ohio

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BRAKES—CORNICE

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Owens-Illinois Glass Co., Toledo, Ohio

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FORMING ROLLS

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Interstate Machinery Co., Chicago, Ill.

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(See Cleaners—Furnace Vacuum)

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Peerless Foundry Co., Indianapolis, Ind.

FURNACE PIPE AND FITTINGS

Peerless Foundry Co., Indianapolis, Ind.

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Payne Furnace and Supply Co., Beverly Hills, Calif.

Round Oak Furnace Co., Dowagiac, Mich.

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FURNACES—OIL BURNING

Motor Wheel Corp., Heater Div., Lansing, Mich.

FURNACES—WARM AIR

(See Also Unit Air Conditioners)

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Brillion Furnace Co., Brillion, Wis.

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Hess Warming & Vent. Co., Chicago, Ill.

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Independent Register & Mfg. Co., Cleveland, Ohio

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HANDLES—FURNACE DOOR

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Meyer & Bro. Co., F., Peoria, Ill. Sallada Mfg. Co., Minneapolis, Minn.

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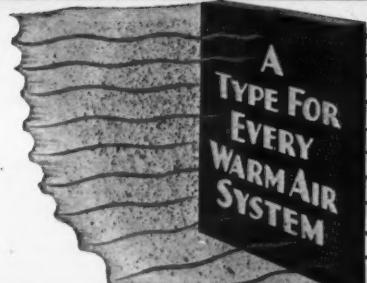


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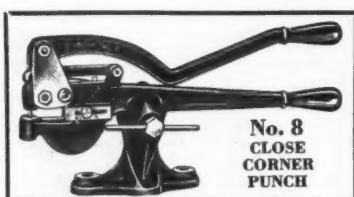
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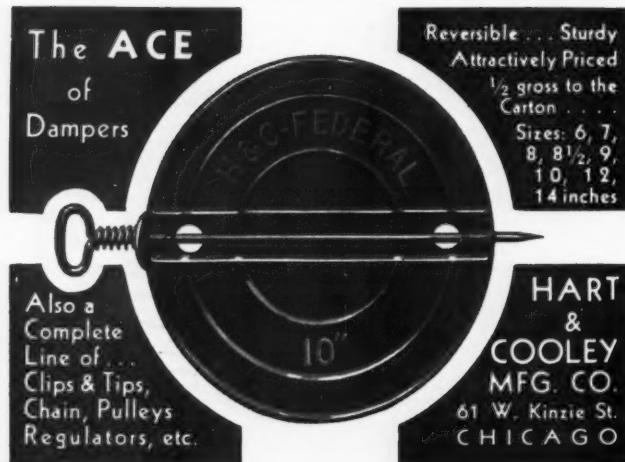
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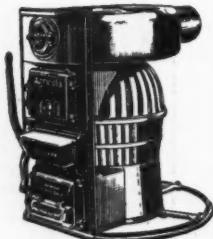
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PUNCHES

Bertsch & Co., Cambridge City, Ind.
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Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

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PUNCHES—HAND

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Newport Rolling Mill Co., The, Newport, Ky.
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SHEET METAL

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METAL

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(See Machines—Tinsmith's)

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(See Cleaners—Furnace
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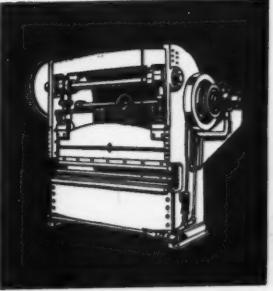
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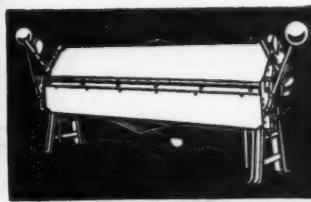
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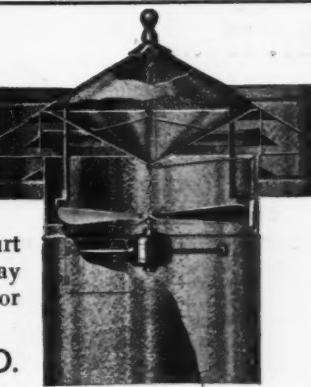
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"E-Z FIT" EAVES TROUGH
Bead is cut back, making it easy to put gutter together. Requires no soldering—not affected by expansion or contraction.

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"BB" The mark of quality
Eaves Trough . Gutter Hangers . Conductor Pipe
Conductor Fasteners . Mitres . End Pieces and Caps
Conductor Heads . Ornamental Straps . Ventilators, etc.

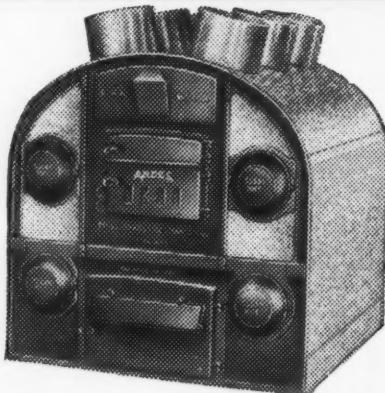
BERGER BROTHERS CO.
229-237 Arch Street, Philadelphia, Pa.

Mr. Dealer

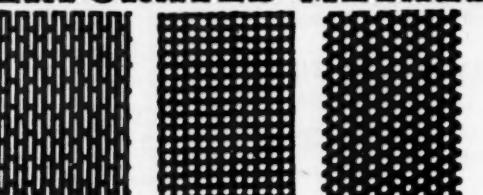
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real merchan-
dising idea.

Write
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ANDES RANGE & FURNACE CORP., Geneva, N.Y.



PERFORATED METALS



All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.

For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATING METAL

THE HARRINGTON & KING PERFORATING CO.

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82%
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AREA

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Floor Registers

ANY SIZE . . . ANY FINISH
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NEW PROFITS FOR FURNACE MEN NOW

ASK FOR COMPLETE
INFORMATION ABOUT

NIAGARA
GAS AND COAL WARM AIR
FURNACES

THE FOREST CITY FOUNDRIES COMPANY
Cleveland, Ohio

CLASSIFIED ADVERTISING

BUSINESS CHANCES

LIGHTNING RODS

Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. Address L. K. Diddie Company, Marshfield, Wis.

SITUATIONS OPEN

WANTED—AN ALL AROUND MAN FOR tin shop work, one that can do plumbing, heating, roof and gutter work, pump and windmill work, and shop repair work. State age, experience, wages wanted in application. In good times we employ steady all year around job. Address E. L. Severson, Hollandale, Wisconsin.

SITUATIONS WANTED

MANUFACTURERS OF WARM AIR furnaces and heating appliances, will find in me an unusual opportunity for your sales promotion work. I understand the furnace and fitting business through years of actual experience from installation, dealers, and sales manager for wholesale purposes. Am a graduate engineer, know forced air, gravity, standard code, air conditioning, designing of systems for sales work, etc. Member of A.S.H.E. I desire connection with manufacturer as sales representative or branch manager, best of references. Address Key 125, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

SITUATION WANTED—CAN YOU MAKE use of this ability? Complete knowledge of and wide experience in every phase of warm air heating, selling, designing, installing. Thorough knowledge of every essential of repair work, advertising and sales promotion experience of high type. A good working knowledge of domestic air conditioning. Experienced in training and developing salesmen. Ready after April 20. Address Key 126, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

SITUATION WANTED—LICENSED D. plumber, employed at present, desires steady position in small or medium sized town, Southern Colorado preferred. Address Key 128, "American Artisan," 1900 Prairie Ave., Chicago, Illinois.

SITUATION WANTED—BY MAN 38 years old. 15 years' experience in general hardware. Best references. Address L. J. Bergman, Iowa Falls, Ia.

SITUATION WANTED—MAN WITH real record of sales promotion in retail field and experienced air conditioning engineer is open for connection with manufacturer or large retail organization. Best of references. Address Key 116, "American Artisan," 1900 Prairie Avenue, Chicago.

SITUATION WANTED—A-1 SHEET metal worker, plumber and heating man with 25 years' experience at the trade. Strictly sober and reliable. Would like good steady position. Would prefer Southern Wisconsin or Northern Illinois but will go anywhere. Address Key 119, "American Artisan," 1900 Prairie Avenue, Chicago.

SITUATION WANTED—BY MIDDLE aged combination man, expert on heating. Can do a good job of plumbing or sheet metal work. Good salesman. Hardware experience. References. Address Key 105, "American Artisan," 1900 Prairie Avenue, Chicago.

WANTED—POSITION BY FIRST CLASS sheet metal worker. Can do anything in that line. Also, can do estimating and designing of dust and shaving collecting systems. Able to take complete charge of shop and show results. Address Arno Goethel, 20-8th St., N.E., Rochester, Minn.

SITUATION WANTED—HAVE HAD 28 years' experience as tinner and plumber. Am qualified to do work in the following lines: auto radiator repairing, erecting steel ceilings, pump and windmill repairing, steam and hot water work, installing radios, and any kind of mechanical job that comes in a shop. Can give good references. Address Key 121, "American Artisan," 1900 Prairie Avenue, Chicago.

SITUATION WANTED—A FIRST CLASS, A-1 Mechanic with more than twenty years' experience in all lines of the sheet metal trade wishes to hear from someone who needs a first class man. Can give best of references and go anywhere. Address Edward H. Collins, 154 Oakland Avenue, Macon, Georgia.

POSITION WANTED—BY WELL EXPERIENCED hardware salesman in store. Excellent references. Also, can put on sale to your advantage. Address Key 117, "American Artisan," 1900 Prairie Avenue, Chicago.

FOR SALE

FOR SALE—ONE 8 FT., 18 GA. CHICAGO steel brake, \$85.00 on skids, f.o.b. Wauseon, in good condition. Address Cecil C. Coon, 252 W. Chestnut St., Wauseon, Ohio.

FOR SALE—WELL ESTABLISHED sheet metal and furnace shop in city of 10,000 population in South Dakota. On account of the death of my husband I will sacrifice it for \$2,000 cash or other arrangements might be considered. This includes a complete outfit of tools, stock, several furnaces and a 1929 1 1/2-ton Chevrolet truck. For further information, Address Key 127, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE—HEATING, PLUMBING AND TIN BUSINESS—Cheap—Good farming country. Reason for selling old age and ill health. Address Key 123, "American Artisan," 1900 Prairie Avenue, Chicago.

FOR SALE—COURSE IN SHEET METAL design and pattern drafting. Address F. Canonica, 108 So. Arizona, Butte, Montana.

WANTED—A FIRST CLASS TINNER TO buy or operate my shop on a commission basis. A wonderful opportunity for the right man. Old age and sickness compels me to give up the work. Address Key 122, "American Artisan," 1900 Prairie Avenue, Chicago.

FOR SALE—WELL ESTABLISHED sheet metal shop in central Illinois town of 3,500, also fully equipped for radiator repairing. Would consider terms with substantial down payment and good collateral. This is no sacrifice, as it is a going business and unless you have money and are really interested do not reply. Address Key 118, "American Artisan," 1900 Prairie Avenue, Chicago.

FOR SALE—ONE LOT OF SHEET metal working machines, including 8-foot Wooden Truss Brake, 30-inch and 36-inch Square Shears, Marshalltown Throatless Shear, 16-gauge hand power, Cross Lock Machine, twelve various type Burring Machines and 2 sets of 30-inch forming rolls. Above tools acquired in purchase of other shops and will dispose of them at sacrifice for quick sale. Wonderful opportunity for some sheet metal worker just starting up in the business. Smith & Burrows Company, Parkersburg, West Va.

FOR SALE—A WELL ESTABLISHED warm air and sheet metal shop in a city of 22,000 population located in central Missouri. Two large RR. Shops located here, on two State Highways, good schools. Stock will invoice about \$1200.00. Besides, have a complete set of tools with truck. Good reasons for selling. If you are looking for a good business worth the money, write at once. Address Key 129, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE—METAL CEILING MANUFACTURING equipment and dies, one of the best lines manufactured in the country. Will sell reasonable. Address Key 113, "American Artisan," 1900 Prairie Avenue, Chicago.

WANTED TO TRADE, OR, SELL, ONE Eureka lawn mower grinding machine. Would consider a 4, 6 or 8 foot Brake or Key Machine in exchange or buy same. Address F. F. Chapman, Worthington, Indiana.

FOR SALE—COMBINATION SHEET metal and plumbing shop southwest Kansas town; population 9,000. Apartment in shop and house on ground can be rented out. Will adjust inventory to suit buyer. Address H. F. Dobson, Wichita, Kansas.

FOR SALE—1 NO. 2 RYERSON SERPENTINE Shear Motor Drive for \$200, 1 Niagara Small Turning Machine, including No. 11 Elbow Edging Rolls (New) \$15; 1 Niagara Setting Down Machine \$5; 1 Pexto Double Seaming Machine (1 10-inch Disc) \$5; 1 Dreis & Krump Angle Iron Cutter \$5; 1 Mighty Midget Unishear (Brand New) \$40; 1 Old Bench Shear \$2. Address Jos. Koubek & Son, 5234 West 22nd Street, Cicero, Illinois.

LINES TO HANDLE

MANUFACTURER

with complete line of Furnaces, Boilers, Radiation and Water Heaters has few open territories in Central West. Excellent earnings for producers. Address Key 115, "American Artisan," 1900 Prairie Avenue, Chicago.

LINES WANTED

LINES WANTED—EXPERIENCED FURNACE salesman covering Iowa is open for some side lines on commission basis. Address Louis Roos, 1614 East 8th St., Des Moines, Ia.

WANTED TO BUY

WANTED TO BUY—BOX FOLDER BOLT cutters and plumbing tools. State price and condition in first letter. Address O. H. Bergeman, Box 268, Chippewa Falls, Wisconsin.

WANTED TO BUY—USED TEN FT. press brake, 3/16" capacity. Address Toledo Porcelain Enamel Products Company, Toledo, Ohio.

MISCELLANEOUS

PHILIP V. W. PECK
Patent and Trade Mark Law
Barrister Bldg., Washington, D. C.

AIR CONDITIONING SYSTEM FOR RESIDENTIAL application. Takes care of heating, cooling, humidifying, dehumidifying and filtering. Owner and inventor wishes to get in touch with a manufacturer with sufficient finance and manufacturing facilities to make and market this system. Address Key 114, "American Artisan," 1900 Prairie Avenue, Chicago.

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April 25, 1932

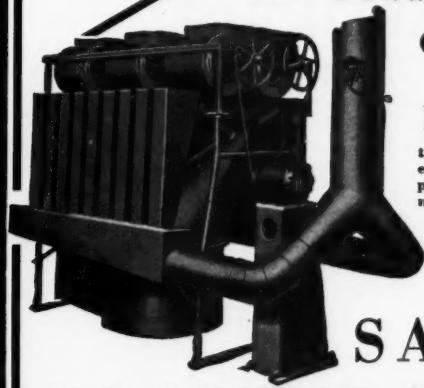
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STRIKE NOW while it's HOT!

The
DAILAIRE
System of
Heating and
Air Conditioning

OFFERS
the
DEALER

the last word in
equipment in com-
pact form, engi-
neered to the latest
principles of
heating and air
conditioning.



SALES POSSIBILITIES

Never in the history of warm air heating has there been offered a line with as great a selling appeal. It offers more than any other line of heating, and now is the time for the dealer to fortify his future in the heating field by signing the Dailaire contract. Full information on request.

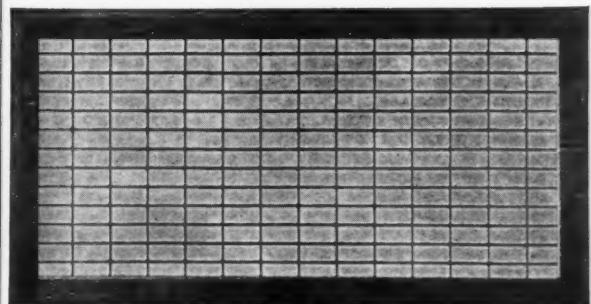
A full line for every need

DAIL STEEL PRODUCTS COMPANY
1050 Main Street

Lansing, Mich.

U. S. Trussteel Faces

Present the finest accomplishment of constructing cold air faces of an assembly of cold rolled steel bars—trussed by deep truss bars and set in perfectly built angle frames.



Frames and construction perfect. Splendidly finished in oak or any standard finish.

Cold rolled steel used entirely instead of rough hot rolled steel "filled" and painted to cover cheap defective stock.

If you prefer this type of face select the U. S. Trussteel and write for catalog and prices.

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Albany, N. Y.

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SUPPLY HOUSES
EVERYWHERE HEATING PLANTS ARE USED

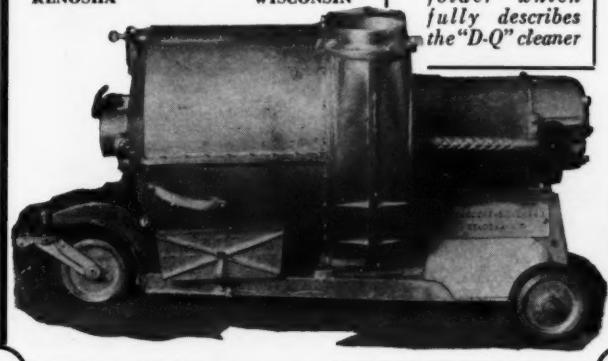
The "D-Q" Cleans THOROUGHLY —and you profit

The "D-Q" Cleaner is a maximum capacity cleaner, one that does the most work in the least possible time, and at a maximum profit to you.

The "D-Q" Cleaner also does much to boost your reputation in your community, and is a means of encouraging future business.

Write for full details that will acquaint you with the "D-Q" Cleaner, and its money-making possibilities.

DENSMORE - QUINLAN CO.
KENOSHA
WISCONSIN



*Send for this
folder which
fully describes
the "D-Q" cleaner*

MARSHALLTOWN



SHEARS

LET MARSHALLTOWN SHEARS CUT YOUR LABOR COSTS



*The Shear
Keeps Sharp
Even After
Months of
Hard Use*

*Put the right
kind of machine
on the right
job.
Save time and
labor costs.
Make it a
MARSHALL-
TOWN.*

*Let the
Catalog
Tell the
Story—
Write
for It
Now*

*There is a
MARSHALL-
TOWN for
every use.
Hand — Motor
— and Belt
Power.*

MARSHALLTOWN MFG. CO.

MARSHALLTOWN
IOWA

ANNOUNCEMENT

OUR
DETROIT OFFICE AND WAREHOUSE
-MOVED-
TO
690 AMSTERDAM AVE.
FORMER LOCATION OF FOLLANSBEE BROS. CO.
TRinity 2-2330

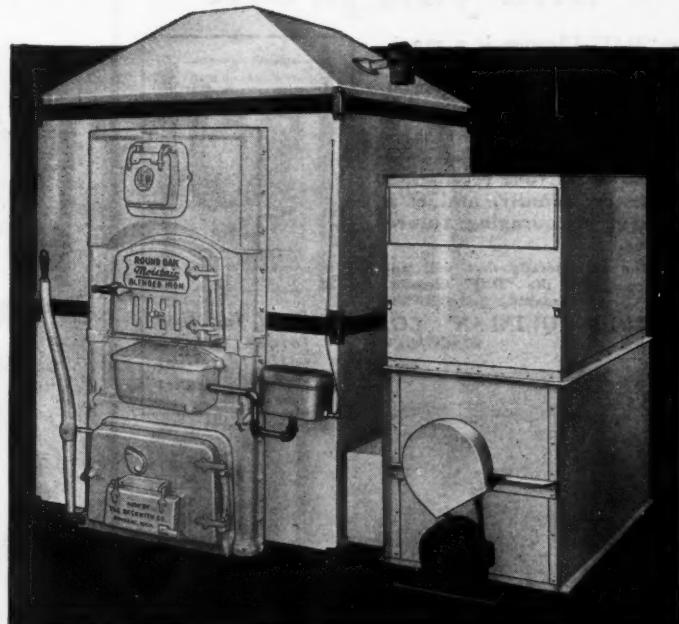
THE J. M. & L. A.
OSBORN CO
DETROIT - CLEVELAND - BUFFALO

**YOU can get more business by
selling ROUND OAK Furnaces!**

Concentrate on our complete
line and you will be able to meet
every warm air heating job in a
way that insures customers of
furnace values that can't be beat.

Furnace dealers can always bank
on Round Oak quality, durability
and real service.

◆
Write today for details of
our agency proposition.
◆



ROUND OAK FURNACE COMPANY : : Dowagiac, Mich.



**GALVANIZED SHEETS
STEEL SHEETS
PLATES AND
TIN PLATE**

GRANITE CITY STEEL CO
GRANITE CITY, ILLINOIS

Today's Problem

LAZY smoke stacks are a symbol of today's business problem. They indicate a business condition that encourages low stocks on hand, holds up production and raw material schedules and invites hurry-up, last-minute orders.

Granite City Steel Co. meets today's problem perfectly for the sheet steel jobber. Adequate warehouse stocks of sheets and plates are ready for immediate shipment from Granite City. And the location of Granite City Steel Co., only 20 minutes from Saint Louis, and served by 29 railroads and the Mississippi River, assures better service to the Mississippi Valley, the West, and the Southwest.

Chicago, Dallas
Kansas City



St. Louis, St. Paul
Salt Lake City



KEY TO ILLUSTRATION

TOP: Milcor "Crimpedge" Gutter — Slip Joint
 UPPER LEFT: Kuehn's Korrett Kut-Offs
 LOWER LEFT: Milcor End and Drops

KEY TO ILLUSTRATION

TOP: Milcor One-Piece Mitre — Inside
 UPPER RIGHT: Milcor Conductor Pipe Elbows
 LOWER RIGHT: Milcor "Interlock" Conductor Pipe

In Milcor you have a source of supply which covers every up-to-date development in quality rain-carrying equipment . . . A line that is complete in all details . . . a service that cannot be surpassed . . . and a reputation that has made Milcor the standard of fine value.

All Milcor rain-carrying equipment is carried in stock for immediate delivery . . . Made from Sheet Steel . . . Copper Alloy Steel . . . Armco Ingot Iron . . . or pure Anaconda Copper. For quick shipment or price information address communications to nearest branch or sales office.

MILCOR PRODUCTS



Save with Steel

MILCOR STEEL COMPANY

MILWAUKEE, WIS., 4117 W. Burnham St. CANTON, OHIO
 Chicago, Ill. Kansas City, Mo. LaCrosse, Wis.

Sales Offices: New York at 418 Pershing Square Building; Boston, Mass., at 136 Federal Street; Atlanta, Ga., at 207 Bona Allen Building; Los Angeles, Calif., at 7267 Clinton Street; Little Rock, Ark., at 104 W. Markham Street

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